

# COMPUTERIZED REDUCTION OF METEOROLOGIC MEASUREMENTS FROM IRRIGATED AND NONIRRIGATED PLOTS IN CENTRAL UTAH<sup>1</sup>

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**ABSTRACT.**— Two FORTRAN IV computer programs were developed to facilitate reduction of meteorologic data from irrigated and nonirrigated plots at Provo, Utah. The first program compiles and tabulates daily, monthly, and yearly summaries of precipitation as rain and/or snow, snowfall, total snow cover, soil moisture, dew, relative humidity, potential evaporation, cloud cover, and wind. Temperature values are tabulated for measurements taken in a standard weather shelter, 5 cm beneath soil surface under grass cover, at soil surface under grass cover, and on bare ground.

The second program enables complete computerized (Calcomp) construction, labeling, and graphing of 10 different meteorologic measurements and 3 calculated comparisons of temperature means.

Advantages of the first computer program relate generally to that obviously noticeable with any computerized tabulation. Those of the second program relate more specifically to the greatly reduced cost of computerized graphs compared with those produced manually, as well as to the marked reduction of errors compared with the number frequently associated with the usual tedious and laborious plotting of voluminous weather data.

Meteorologic data collected for the year demonstrated the beneficial effect of irrigation in the creation of microenvironments for living organisms.

## INTRODUCTION

A comparison of meteorologic measurements from irrigated and nonirrigated plots in Provo, Utah, for 1970 through 1972 was published recently by Andersen, Wright, and Fox (1974). Included in their report was a detailed description of the study area, instrumentation employed, method of handling meteorologic data, and a series of manually reproduced graphs depicting the results for those three years. The current report is designed as a companion article to the one referred to above. It extends the meteorologic measurements through 1973 for an adjacently located plot watered via sprinkling as opposed to flood irrigation used in the previous project. Furthermore, it emphasizes those changes that have been incorporated to enable the graphing of 10 different meteorologic measurements and 3 comparisons of calculated means by a Calcomp plotter.

The importance of irrigation in creating optimum microenvironments for biological organisms has been substantiated for such invertebrates as mosquitoes (Rainy and Hess, 1967; Reeves and Hammon, 1962), snails (World Health Organization, 1950), and nematode larvae (Furman, 1944; Honess and Bergstrom, 1966; Fox, Andersen, and Hoopes, 1970; and Wright and Andersen, 1972). The importance was elaborated upon further by Andersen

et al. (1974) and, thus, will not be discussed here.

## DESCRIPTION OF EXPERIMENTAL PLOT

The experimental plot measured 10 x 30 m and was located at the Brigham Young University Animal Science Farm, Provo, Utah, adjacent to the plot used in the study by Andersen et al. (1974). The coordinates of the station site, elevation, description of vegetative cover, soil type and drainage, instrumentation, and method of collecting data were the same as reported earlier. The plot was divided into an irrigated and a nonirrigated section separated by an elevated dike. Additional diking, approximately 8 in (20 cm) high, was also placed around the upper border and sides of the plot to prevent any flood irrigation waters from entering the experimental area. Beginning in May the irrigated portion was sprinkled each Monday with a total of 1 in (2.5 cm) of water as measured in the rain gauge. This was applied at an approximate rate of 0.5 in/hr. In June the amount was increased to 1.5 in (3.25 cm) and in July to 2 in (5.0 cm). The amounts were reversed for August, September, and October, after which time sprinkling ceased. This regimen for 1973 added a total of 39 in (97.5 cm) of water to the irrigated plot over the six month period.

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### DESCRIPTIONS OF PROGRAMS

TWO FORTRAN IV programs, one for data tabulation and a second for Calcomp graphing, were developed for this project. Figure 1 outlines the collation and handling of meteorological data and Figures 2 and 3 illustrate flow charts for the data tabulation and Calcomp graphing programs respectively. All meteorologic data for the year were entered on specially designed worksheets (Figs. 4 and 5), key-punched on 80-column IBM cards, and handled as diagrammed. All mensural data not already in the metric system were so transposed by appropriate con-

version formulae. Also, the printing of all negative or zero values was suppressed whenever such data were not meaningful.

The first program compiles and tabulates daily, monthly, and yearly summaries of all meteorologic data collected. Tables 1, 2, and 3 are sample printouts of one month's data (May 1973), and Tables 4 and 5 are the two-page annual summary sheets.

The second program developed for the project enables complete computerized

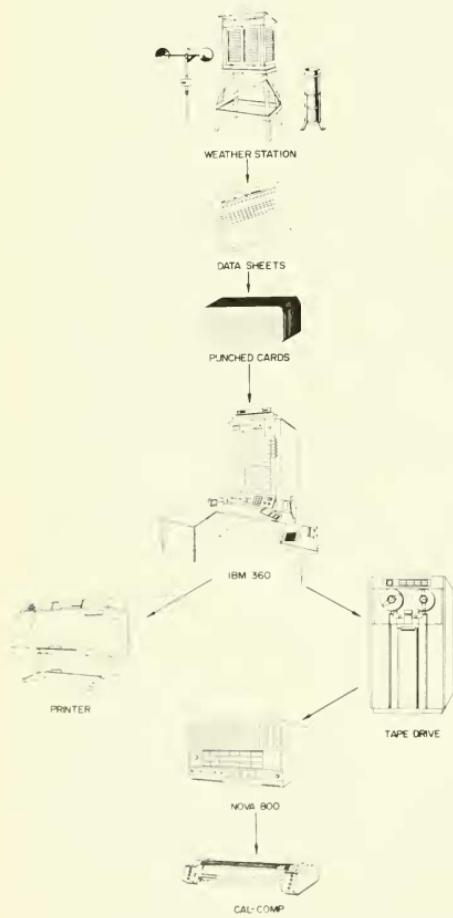


Fig. 1. Diagram showing how meteorologic data were collated and handled.

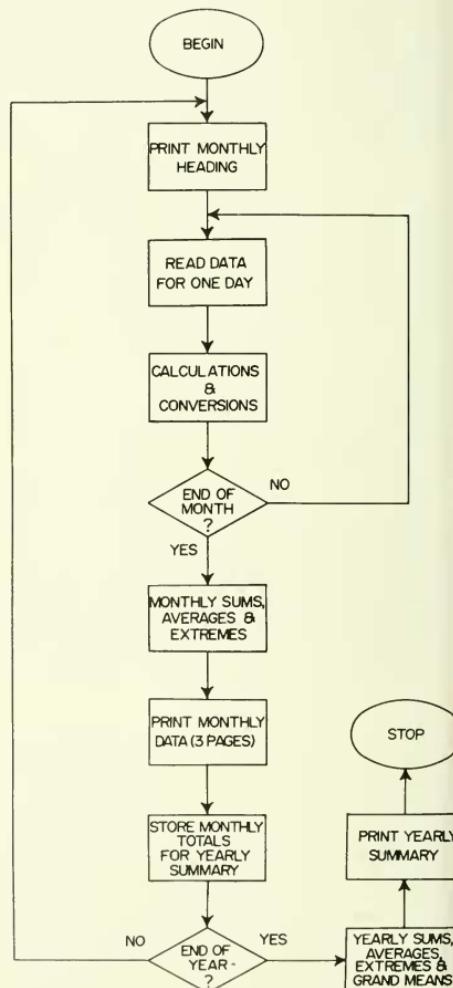


Fig. 2. Flow chart for the data tabulation program.

plotting of 10 different meteorologic measurements and 3 calculated mean temperature comparisons. Each deck of program data for any one year must be preceded by a control card identifying the year and number of days in that year. Also included on the control card for the Calcomp plotting program is a list of identifying numbers which permit selection of desired graphs for that year. These graphs are then completed sequentially as selected.

Figures 6 through 18 depict computerized reproduction of 10 different meteorologic measurements taken during 1973

and 3 calculated comparisons of means as indicated on each individual legend. Table 6 gives information for the 1973 data regarding the approximate run times and current costs for the IBM 360/65 installation at Brigham Young University.

The complete printout of all daily, monthly, and yearly data is available upon request for the cost of reproduction. Both computer programs are printed herein (Appendix) for researchers who might find sections or subroutines applicable to their specific needs in meteorology or biology.

Regarding specific handling of meteoro-

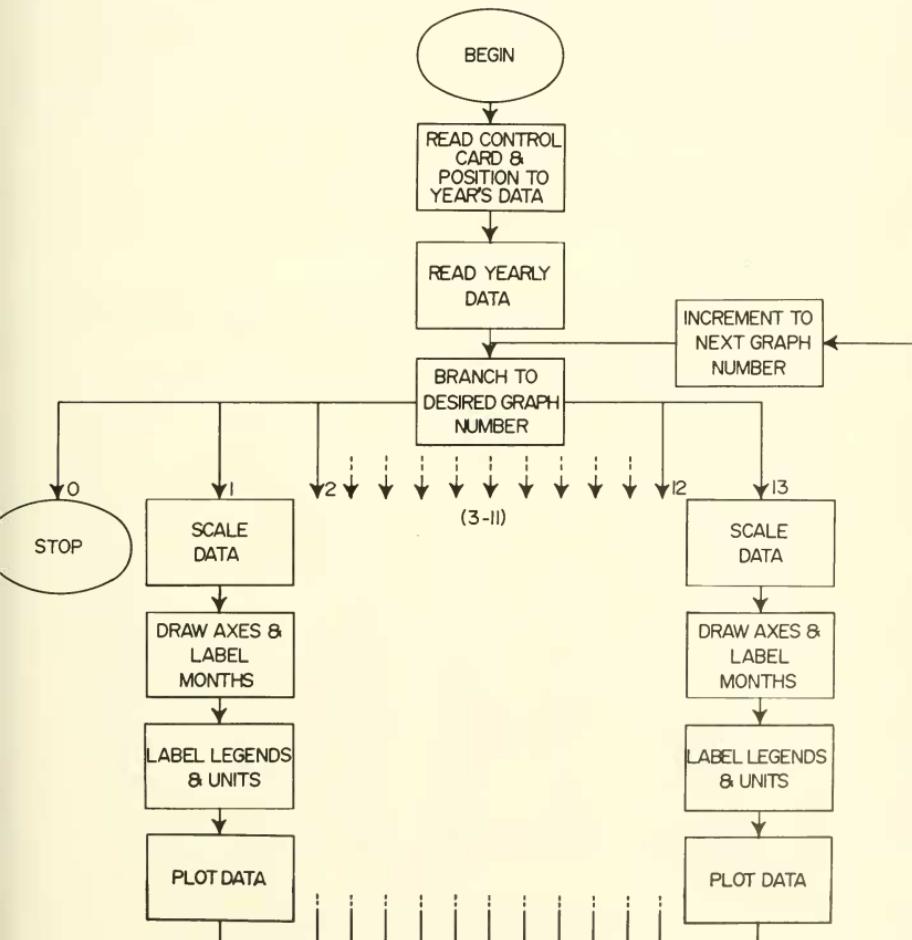


Fig. 3. Flow chart for the Calcomp plotting program.

TABLE 1. Sample monthly summary of measurements on precipitation, soil moisture, relative humidity, potential evaporation, cloud cover, and wind—May 1973.

DAY OF YEAR	PRECIPITATION (MM)					SOIL MOISTURE			RELATIVE HUMIDITY		HRS OF 98-100 REL-HUM	POT EVAP (MM)	CLOUD COVER (0-10)	WIND (KM/H)
	TOTAL PREC	RAIN PREC	SNOW PREC	SNOW FALL	SNOW COVER	IRRIGATED PERCENT DEW	NON-IRRIG. PERCENT DEW	MAX	MIN					
1 121	1.0	1.0				+	+	100	68	18	0.0	5	50	
2 122	0.3	0.3				+	+	100	24	6	7.0	1	34	
3 123						+	+	100	30	2	8.2	5	50	
4 124						+	+	98	38	0	4.8	5	61	
5 125						+	+	100	37	11	2.8	8	50	
6 126	0.5	0.5				+	+	100	72	8	8.8	4	66	
7 127						12.6	+	98	42	4	7.2	5	42	
8 128						17.5	+	170	46	9	10.4	9	56	
9 129						+	+	98	26	5	8.6	0	29	
10 130						+	+	99	40	6	7.4	1	34	
11 131						+	+	98	32	8	9.0	0	24	
12 132						+	+	98	36	4	13.4	0	37	
13 133						+	+	100	36	5	10.0	1	37	
14 134						9.9	+	100	32	4	8.4	1	61	
15 135						20.7	+	100	36	6	8.6	3	34	
16 136						+	+	100	34	4	13.4	0	37	
17 137						+	+	100	36	5	10.0	0	42	
18 138						+	+	100	43	6	11.6	0	61	
19 139	2.5	2.5				+	+	100	41	8	6.8	3	55	
20 140	0.5	0.5				8.1	+	100	38	6	2.0	7	58	
21 141						18.9	+	100	32	1	10.2	0	35	
22 142						+	+	100	46	4	5.2	4	82	
23 143						+	+	100	82	22	3.2	10	39	
24 144	5.1	5.1				+	+	99	44	12	6.6	8	82	
25 145	24.1	24.1				16.8	+	100	35	9	8.8	0	21	
26 146						24.1	+	100	28	4	9.2	0	34	
27 147						+	+	100	36	7	8.6	2	18	
28 148						+	+	100	38	6	9.2	2	40	
29 149						+	+	100	38	6	9.2	2	40	
30 150						+	+	100	38	6	9.2	2	40	
31 151						+	+	100	38	6	9.2	2	40	
TOTALS	34.0	34.0	0.0	0.0	0.0	128.6	23	4	37.7	21		240.2	1418	
MEANS	1.1	1.1	0.0	0.0	0.0	16.1		9.4	97	39	6	7.7	2	45
EXTREMES	HIGH	24.1	24.1	0.0	0.0	24.1		15.3	100	82	22	13.4	10	82
	LOW	0.0	0.0	0.0	0.0	8.1		4.4	58	24	0	0.0	0	18

\* DATE OF IRRIGATION (MAY THROUGH OCTOBER)

TABLE 2. Sample monthly summary of temperatures measured from a standard weather shelter and at 5 cm beneath soil surface under grass cover—May 1973.

DAY OF YEAR	WEATHER SHELTER TEMPERATURES			5 CM BEHNEATH SOIL SURFACE								
	THERMOMETER			HYDROTHERMOMETER			IRRIGATED			NON-IRRIGATED		
MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	
1 121	13.3	-3.3	5.0	8.9	-1.1	3.9	12.0	6.0	9.0	12.0	6.3	9.0
2 122	15.6	0.0	7.8	15.0	0.0	7.5	16.2	8.3	12.3	17.2	7.2	12.9
3 123	21.7	6.7	14.2	21.1	7.8	14.6	19.0	11.0	15.0	30.0	11.0	20.5
4 124	21.1	7.8	14.4	20.6	7.8	14.2	18.9	12.3	15.7	20.2	12.0	16.0
5 125	23.0	5.0	12.5	19.4	5.6	12.5	18.0	11.0	14.5	18.1	11.2	14.5
6 126	18.9	6.7	12.8	18.3	7.8	13.1	18.0	12.0	15.0	20.0	12.0	16.0
7 127	18.9	6.1	12.5	6.1	6.7	6.4	19.0	13.0	16.7	21.1	13.2	17.5
8 128	19.4	2.2	10.8	18.3	2.2	10.3	17.0	10.0	13.5	19.7	13.2	14.5
9 129	23.9	5.0	14.4	23.3	5.6	14.4	20.0	12.0	16.0	23.0	12.0	17.5
10 130	23.3	4.4	15.9	22.2	4.4	15.3	21.0	12.0	16.0	24.3	13.2	18.5
11 131	23.9	6.1	15.0	22.8	5.6	14.2	20.0	10.5	15.0	21.0	11.0	17.0
12 132	26.7	8.3	17.5	25.6	8.7	16.1	23.0	10.0	17.0	23.0	12.0	17.5
13 133	23.1	8.3	17.2	25.6	8.3	16.9	23.0	12.0	17.5	24.1	13.2	18.5
14 134	25.6	6.1	15.8	24.6	6.7	15.6	23.0	10.0	16.5	24.0	12.0	18.0
15 135	25.6	5.6	15.6	25.6	6.1	15.8	25.0	11.0	18.0	24.0	11.0	17.5
16 136	27.8	6.7	17.2	26.7	7.2	16.9	25.0	12.0	18.5	24.0	13.0	18.5
17 137	28.3	7.2	17.8	27.8	7.8	17.8	26.7	13.0	19.5	26.0	13.0	19.5
18 138	30.0	10.0	20.0	28.9	11.1	20.0	24.0	15.0	19.5	27.0	16.0	21.5
19 139	27.8	10.0	18.9	27.2	10.6	18.9	26.0	14.0	20.0	26.0	14.0	20.0
20 140	26.1	19.6	18.3	25.0	11.1	18.1	26.0	15.0	20.5	25.0	15.0	20.0
21 141	23.3	5.0	14.2	21.7	5.6	13.6	25.0	12.0	18.5	26.0	13.2	19.5
22 142	23.9	5.0	14.6	23.3	5.6	14.4	25.0	12.0	18.5	27.0	14.0	20.5
23 143	26.7	10.6	16.6	26.1	11.1	16.0	27.0	12.0	21.0	28.0	16.0	22.0
24 144	27.2	9.4	18.3	26.7	10.0	18.3	25.0	15.0	21.1	27.0	12.0	21.5
25 145	12.2	3.9	8.1	10.0	4.4	7.2	15.0	10.0	12.5	16.0	10.0	13.0
26 146	13.9	0.0	6.9	13.3	1.1	7.2	19.0	9.0	14.0	20.2	10.2	15.0
27 147	17.2	1.7	9.4	15.6	2.2	8.9	20.0	10.0	15.0	22.1	11.2	16.5
28 148	22.2	3.9	13.1	21.1	4.4	12.8	23.0	12.0	17.5	35.0	12.0	23.5
29 149	23.9	6.1	15.0	23.3	6.7	15.0	24.0	12.0	18.1	26.0	13.2	19.5
30 150	25.0	6.7	15.8	24.4	6.7	15.6	24.0	14.0	19.1	27.1	15.2	21.0
31 151	26.1	5.4	17.8	25.6	10.0	17.8	22.0	15.0	18.5	25.0	16.0	20.5
MEANS	22.8	5.8	14.3	21.4	6.3	13.9	21.5	11.8	16.7	23.5	12.4	17.9
EXTREMES	HIGH	30.0	11.6	28.9	11.1	11.1	27.0	15.0	18.0	35.0	16.0	
	LOW	12.2	-3.3	6.1	-1.1		12.0	6.0	9.0	12.0	6.0	

ALL TEMPERATURES IN DEGREES CELSIUS

TABLE 3. Sample monthly summary of temperatures measured from a standard weather shelter, at soil surface under grass cover, and on bare soil surface—May 1973.

DAY OF DAY YEAR	WEATHER SHELTER			SOIL SURFACE UNDER GRASS COVER						BARE SOIL SURFACE					
	THERMOMETER			IRRIGATED			NON-IRRIGATED			IRRIGATED			NON-IRRIGATED		
	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN
1 121	13.3	-3.3	5.0	18.0	4.0	11.0	18.0	3.0	10.5	29.0	-1.0	14.0	32.0	0.0	16.0
2 122	15.6	0.0	7.8	20.0	6.0	13.0	24.0	5.0	14.5	36.0	0.0	18.0	37.0	1.0	19.0
3 123	21.7	6.7	14.2	23.0	9.0	16.0	26.0	10.0	20.5	43.0	5.0	24.0	44.0	7.0	25.5
4 124	21.1	7.6	14.4	26.0	10.0	18.0	27.0	10.0	19.5	41.0	5.0	23.0	45.0	8.0	25.5
5 125	20.0	5.0	12.5	21.0	8.0	15.0	24.0	9.0	16.5	41.0	5.0	23.0	42.0	7.0	24.0
6 126	18.9	6.7	12.8	22.0	11.0	16.5	24.0	11.0	17.5	42.0	6.0	24.0	45.0	7.0	26.0
7 127	18.9	6.1	12.5	24.0	11.0	17.5	26.0	12.0	19.0	47.0	6.0	26.5	52.0	8.0	30.0
8 128	19.4	2.2	10.8	20.0	8.0	14.0	22.0	8.0	15.0	38.0	2.0	20.0	42.0	4.0	23.0
9 129	23.9	5.0	14.4	25.0	10.0	17.5	28.0	10.0	19.0	50.0	-1.0	24.5	55.0	6.0	30.5
10 130	23.3	4.4	14.9	25.0	10.0	17.5	30.0	10.0	20.0	52.0	3.0	27.5	55.0	0.0	27.5
11 131	23.9	6.1	15.0	23.0	12.0	21.0	30.0	8.0	19.0	54.0	8.0	27.0	59.0	4.0	21.0
12 132	24.7	8.3	17.5	38.0	10.0	26.0	35.0	9.0	22.0	50.0	8.0	20.0	51.0	4.0	21.5
13 133	26.1	8.3	17.2	37.0	11.0	24.0	35.0	9.0	22.0	52.0	9.0	30.5	52.0	3.0	26.0
14 134	25.6	6.1	15.8	42.0	10.0	26.0	36.0	8.0	22.0	54.0	8.0	31.0	55.0	4.0	29.5
15 135	25.6	5.6	15.6	40.0	10.0	25.0	35.0	8.0	21.5	55.0	7.0	31.0	57.0	2.0	29.5
16 136	27.8	6.7	17.2	43.0	11.0	27.0	36.0	9.0	22.5	56.0	9.0	32.5	58.0	4.0	31.0
17 137	28.3	7.2	17.8	43.0	12.0	27.5	39.0	10.0	24.5	59.0	10.0	34.5	58.0	5.0	31.5
18 138	30.0	10.0	20.0	42.0	15.0	25.5	41.0	12.0	25.5	60.0	15.0	37.0	59.0	10.0	34.5
19 139	27.8	10.0	18.9	49.0	11.0	31.5	43.0	12.0	27.5	61.0	12.0	36.0	61.0	8.0	34.5
20 140	26.1	10.6	18.3	46.0	14.0	30.0	37.0	13.0	25.0	62.0	13.0	32.5	53.0	8.0	30.5
21 141	23.3	5.0	14.2	36.0	12.0	24.0	38.0	9.0	23.5	32.0	9.0	29.5	53.0	4.0	28.5
22 142	23.9	5.0	14.4	46.0	9.0	26.5	43.0	9.0	26.0	45.0	9.0	27.0	57.0	4.0	30.5
23 143	26.7	10.6	18.6	45.0	13.0	29.0	40.0	13.0	26.5	55.0	14.0	32.0	60.0	10.0	35.0
24 144	27.2	9.4	18.3	47.0	14.0	30.5	45.0	12.0	29.5	52.0	9.0	30.5	59.0	11.0	35.0
25 145	26.2	3.9	11.1	10.0	11.0	11.0	17.0	7.0	12.0	18.0	12.0	15.0	32.0	3.0	15.0
26 146	13.9	0.0	6.9	34.0	8.0	21.0	27.0	7.0	17.0	31.0	6.0	18.5	28.0	2.0	15.0
27 147	17.2	1.7	9.4	36.0	8.0	22.0	31.0	8.0	19.5	37.0	6.0	21.5	38.0	5.0	21.5
28 148	22.2	3.9	13.1	32.0	11.0	21.5	36.0	10.0	23.0	34.0	9.0	21.5	47.0	7.0	27.0
29 149	23.9	6.1	15.0	40.0	11.0	25.5	39.0	10.0	24.5	38.0	9.0	23.5	51.0	8.3	29.5
30 150	25.0	6.7	15.8	39.0	12.0	25.5	39.0	12.0	25.5	43.0	11.0	27.0	52.0	12.0	31.0
31 151	26.1	9.4	17.8	39.0	14.0	26.5	38.0	14.0	26.0	46.0	14.0	30.0	53.0	12.0	32.5
MEANS	22.8	5.8	14.3	33.7	10.4	22.0	32.4	9.7	21.1	44.7	7.5	26.1	48.6	5.5	27.1
EXTREMES															
HIGH	30.0	10.6		49.3	15.0		45.0	16.0		61.0	15.0		61.0	12.0	
LOW	12.2	-3.3		18.0	4.0		17.0	3.0		17.0	-1.0		15.0	3.0	

ALL TEMPERATURES IN DEGREES CELSIUS

Table 4. Yearly summary of measurements on precipitation, soil moisture, relative humidity, potential evaporation, cloud cover, and wind—1973.

MONTH	PRECIPITATION (MM)				SOIL MOISTURE (PERCENT)				RELATIVE HUMIDITY				HRS OF 98-100 REL HUM	POT EVAP (MM)	CLOUD COVER (0-10)	WIND (KM)
	TOTAL PREC	RAIN PREC	SNOW PREC	SNOW FALL	SNOW COVER	IRRG	NON-IRR	MAX	MIN	--	--	--	ND	ND	ND	ND
JANUARY	29.7	0.0	25.7	297.2	3302.0	--	ND	98	76	--	17	--	ND	ND	6	1183
FEBRUARY	33.8	31.7	2.0	23.3	363.2	--	ND	98	66	--	14	--	ND	ND	5	1144
MARCH	86.6	58.7	27.9	279.4	287.0	--	ND	98	57	--	11	--	ND	ND	6	2012
APRIL	44.4	33.0	11.4	114.3	114.3	--	ND	98	50	--	8	--	ND	ND	4	1901
MAY	34.0	34.0	0.0	0.0	0.0	--	ND	97	39	--	6	7.7	--	240.2	2	1418
JUNE	18.3	18.3	0.0	0.0	0.0	--	ND	97	35	--	5	9.0	--	268.6	2	1215
JULY	19.8	19.8	0.0	0.0	0.0	--	ND	99	39	--	7	9.6	--	299.1	1	889
AUGUST	51.8	51.8	0.0	0.0	0.0	--	ND	98	34	--	7	11.9	--	368.4	1	1061
SEPTEMBER	39.4	39.4	0.0	0.0	0.0	--	ND	99	46	--	9	6.6	--	197.8	2	766
OCTOBER	13.2	13.2	0.0	0.0	0.0	--	ND	99	42	--	8	2.9	--	88.4	2	1198
NOVEMBER	80.5	17.0	63.5	635.0	1531.6	--	ND	99	58	--	11	ND	--	ND	5	1210
DECEMBER	45.0	0.0	45.0	449.6	970.3	--	ND	99	69	--	15	ND	--	ND	5	1329
YEARLY TOTAL	496.6	317.0	179.6	1795.8	6568.4	--	--	--	--	--	1462.4*	--	--	15326		
GRAND MEAN	1.4	0.9	0.5	4.9	17.9	22.7*	9.4*	98	50	9	7.9*	3	41			

ND = NOT DETERMINED

\* CALCULATED 1 MAY THROUGH 31 OCTOBER ONLY

MONTH	YEAR	METEOROLOGIC DATA												PARASITOLOGY				B.Y.U.		
		DATE		PRECIPITATION				SOIL MOISTURE				IRRIGATED				NON-IRRIGATED		POT. EVAP.	OLD COV.	WIND
		DAY	DAY OF YEAR	RAIN (inches)	SNOW NEW (inches)	TOTAL (inches)	WET WEIGHT (grams)	DRY WEIGHT (grams)	DEW (grams)	IRRIGATION (grams)	WET WEIGHT (grams)	DRY WEIGHT (grams)	DEW (grams)	MAXIMUM %	MINIMUM %	TOTAL AT 98% HOURS	DAILY (mm)	DAILY (0ths)	DAILY (miles)	
1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

MONTH	YEAR	TEMPERATURES												Page 2					
		DATE		WEATHER SHELTER		IRRIGATED						NON-IRRIGATED							
		DAY	DAY OF YEAR	THERM	HYGRO.	-5 CM	SOIL SURFACE	BARE GROUND	-5 CM	SOIL SURFACE	BARE GROUND	DAY	DAY OF YEAR	THERM	HYGRO.	-5 CM	SOIL SURFACE	BARE GROUND	
1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

TABLE 5. Yearly summary of temperatures measured in a standard weather shelter, at 5 cm beneath soil surface under grass cover, at soil surface under grass cover, and on bare soil surface—1973.

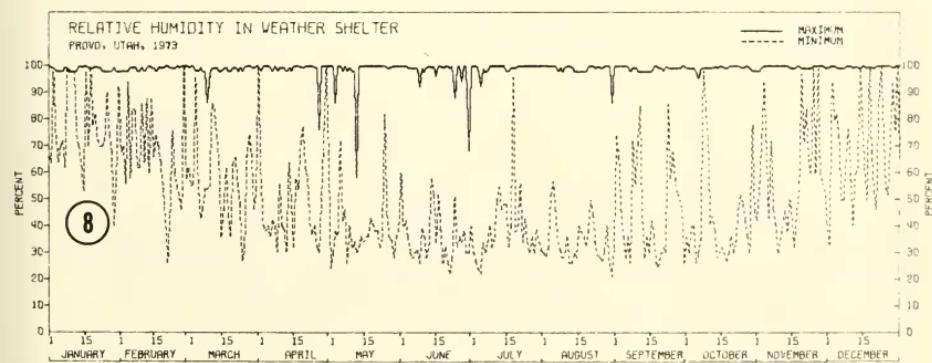
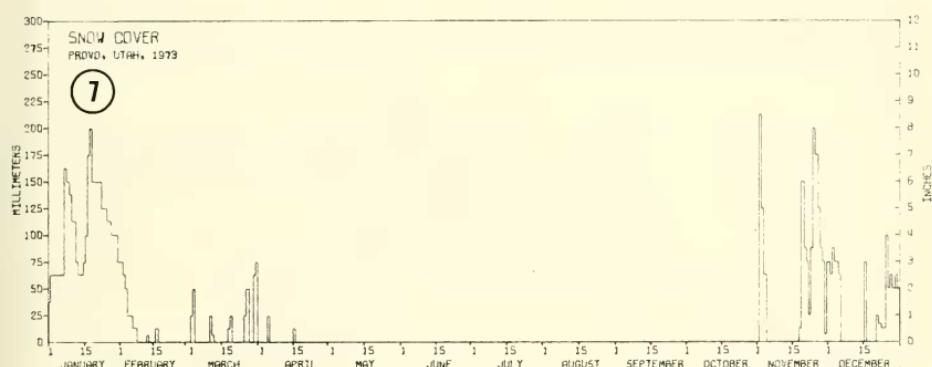
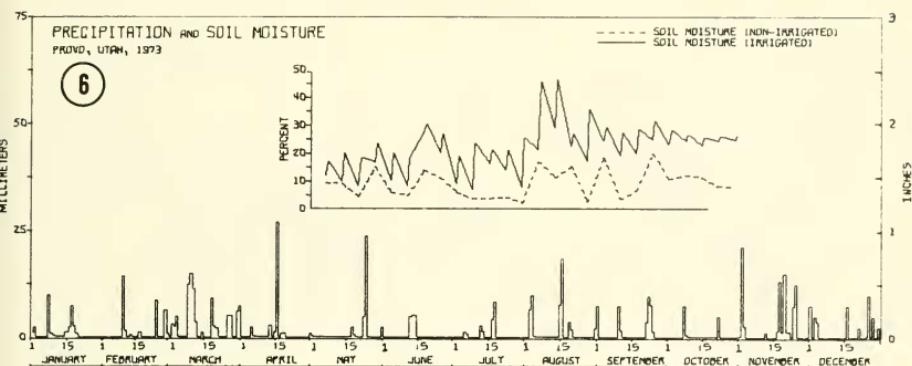
MONTH	WEATHER SHELTER TEMPERATURES						5 CM BEHNEETH SOIL SURFACE					
	THERMOMETER			HYGROTHERMGRAPH			IRRIGATED			NON-IRRIGATED		
	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN
JANUARY	0.6	-12.6	-6.0	-1.1	-11.4	-6.2	-3.4	-4.2	-3.8	-2.4	-3.4	-2.9
FEBRUARY	6.6	-6.3	0.2	5.1	-5.9	-0.4	-1.8	-3.5	-2.7	-0.9	-2.4	-1.6
MARCH	9.0	-3.2	2.9	7.7	-2.5	2.6	4.0	-1.2	1.4	6.1	0.2	3.1
APRIL	12.9	-0.7	6.1	11.6	0.1	5.8	8.4	-1.9	5.1	10.4	3.2	6.1
MAY	20.0	6.0	13.0	21.4	6.3	12.9	21.4	11.0	17.7	21.5	14.1	12.9
JUNE	27.4	8.9	18.2	26.7	9.5	19.1	24.7	15.2	19.9	29.7	16.6	23.1
JULY	31.0	12.4	21.7	30.8	13.3	22.0	28.1	19.1	23.6	36.5	20.2	27.4
AUGUST	31.5	11.8	21.6	31.0	12.8	21.9	26.5	18.4	22.5	31.9	18.8	25.4
SEPTEMBER	23.3	5.5	14.4	22.9	6.7	14.8	19.1	12.6	15.8	22.6	12.1	17.4
OCTOBER	19.4	2.1	10.7	19.0	3.2	11.1	13.0	7.9	10.5	16.2	7.5	11.9
NOVEMBER	9.9	-2.2	3.9	9.3	-1.2	4.0	4.7	2.5	3.6	5.4	2.2	3.8
DECEMBER	5.2	-5.6	-0.2	4.9	-4.7	3.1	5.7	-0.7	-0.2	2.4	-1.1	-0.4
GRAND MEAN	16.6	1.3	9.0	15.8	2.2	9.0	12.1	6.6	9.4	14.8	7.2	11.0

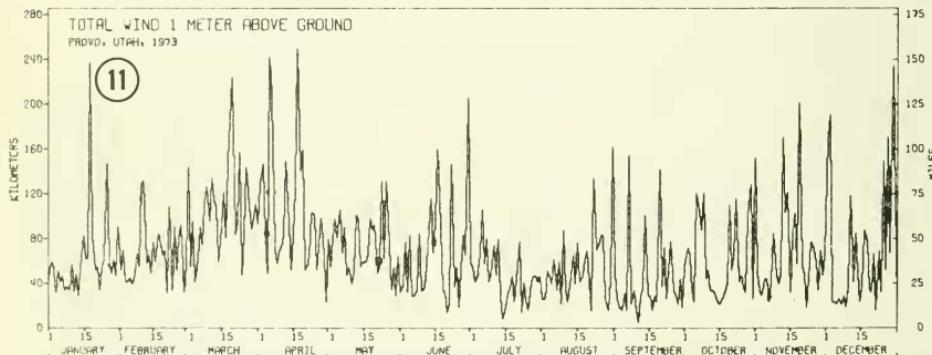
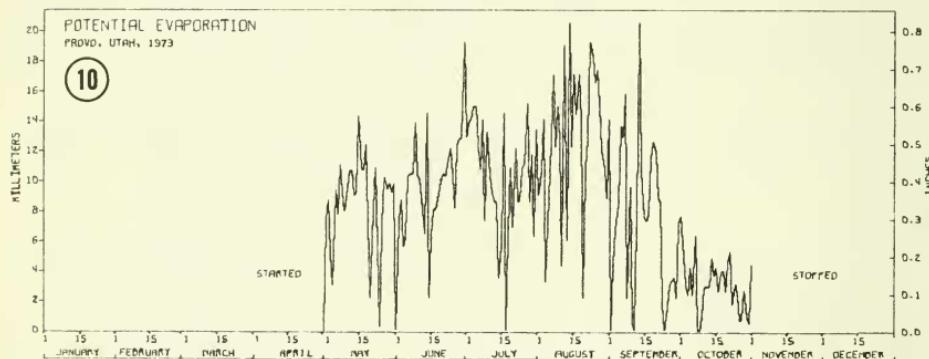
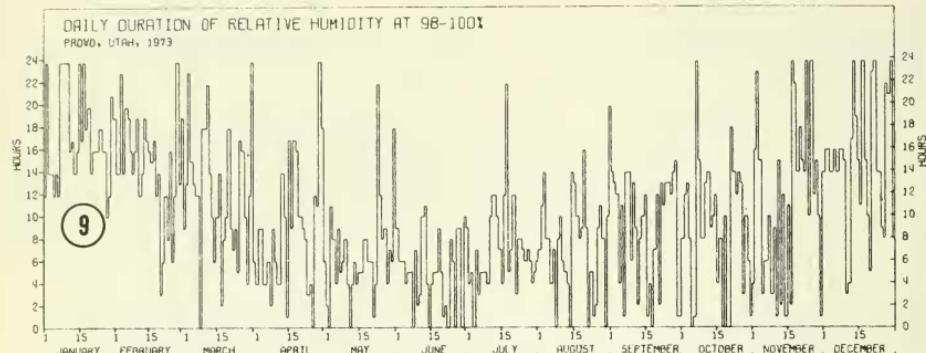
MONTH	SOIL SURFACE UNDER GRASS COVER						BARF SOIL SURFACE					
	IRRIGATED			NON-IRRIGATED			IRRIGATED			NON-IRRIGATED		
	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN
JANUARY	-1.9	-2.5	-2.2	-2.7	-4.2	-3.4	-3.1	-4.5	-3.8	-2.8	-3.9	-3.4
FEBRUARY	1.0	-2.4	-0.7	2.0	-2.9	-0.5	6.5	-5.6	0.4	5.8	-4.3	0.8
MARCH	7.9	-0.3	3.8	10.0	-1.0	4.5	-4.4	-4.4	18.6	-3.1	7.8	
APRIL	12.4	2.6	5.5	15.7	2.1	6.0	25.0	-2.4	11.3	29.3	-1.0	14.1
MAY	32.7	10.4	22.0	32.4	9.7	23.1	44.7	12.5	26.1	46.8	5.5	21.1
JUNE	41.2	13.4	27.3	43.1	13.3	28.2	46.2	12.7	29.4	57.5	13.3	33.9
JULY	35.7	19.8	27.8	50.9	16.4	33.6	44.9	16.3	30.6	62.8	14.5	38.7
AUGUST	32.6	19.5	26.0	44.3	15.9	30.1	44.0	15.8	29.9	55.5	14.2	34.9
SEPTEMBER	24.8	13.4	19.1	31.3	9.7	20.5	33.3	10.1	21.7	40.6	8.0	24.3
OCTOBER	13.0	9.2	13.5	22.8	5.1	14.0	25.1	6.4	15.7	32.8	2.4	17.6
NOVEMBER	8.0	4.3	6.2	7.8	1.2	4.5	12.6	1.8	7.2	12.6	3.0	6.3
DECEMBER	3.5	1.3	2.4	1.8	-1.2	0.3	6.3	-0.4	3.0	4.1	-2.1	1.9
GRAND MEAN	18.1	7.4	12.7	21.6	5.3	13.5	25.3	4.4	14.8	30.5	3.4	16.9

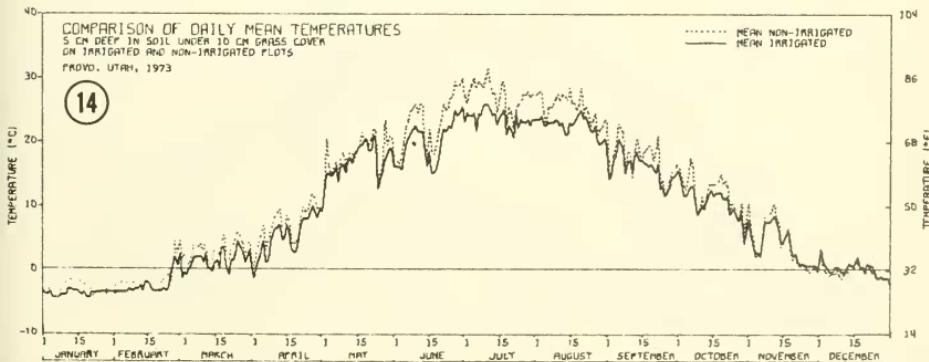
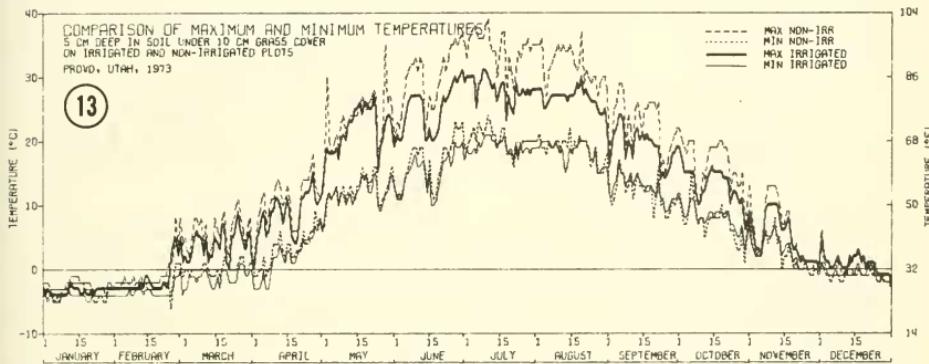
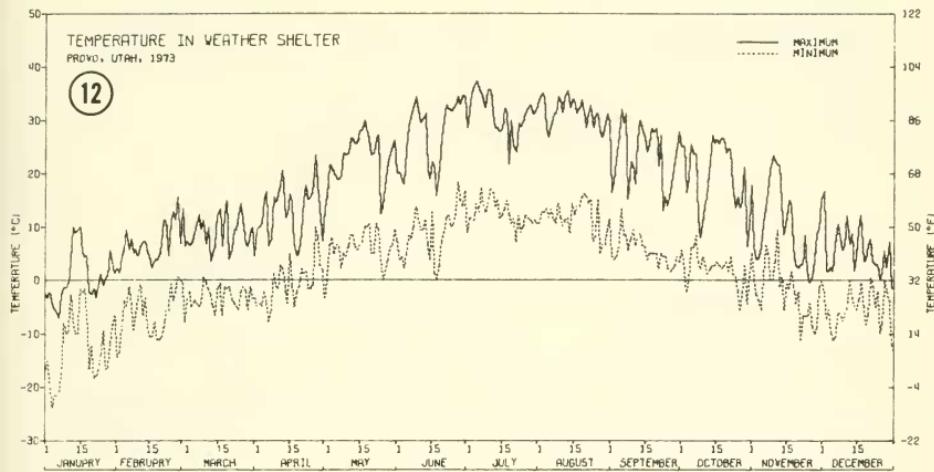
## ALL TEMPERATURES IN DEGREES CELSIUS

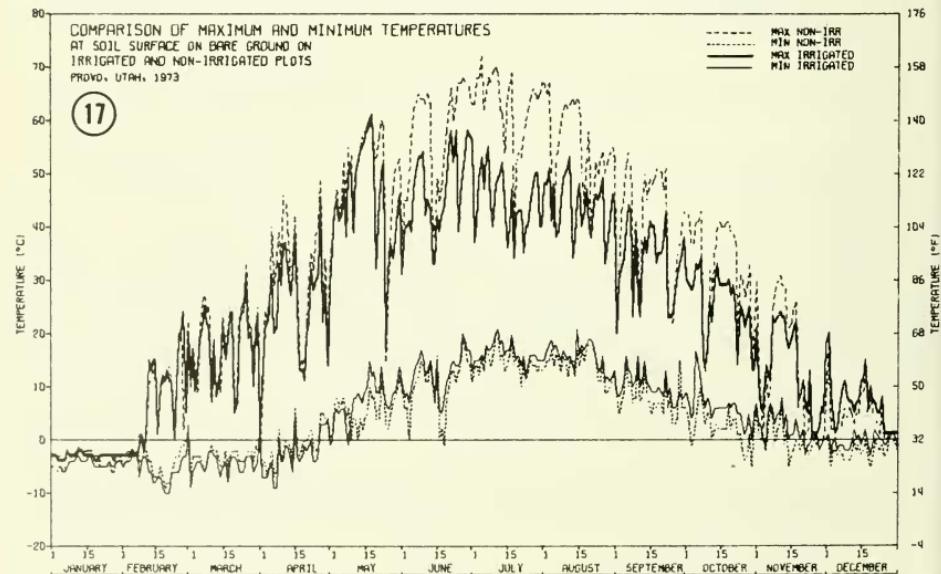
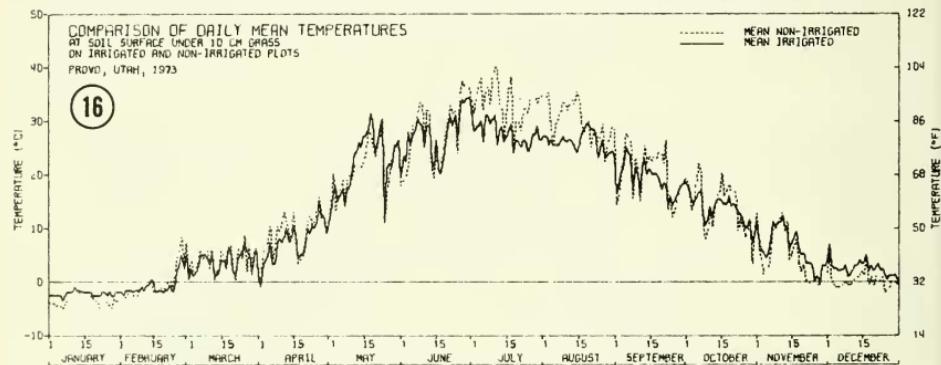
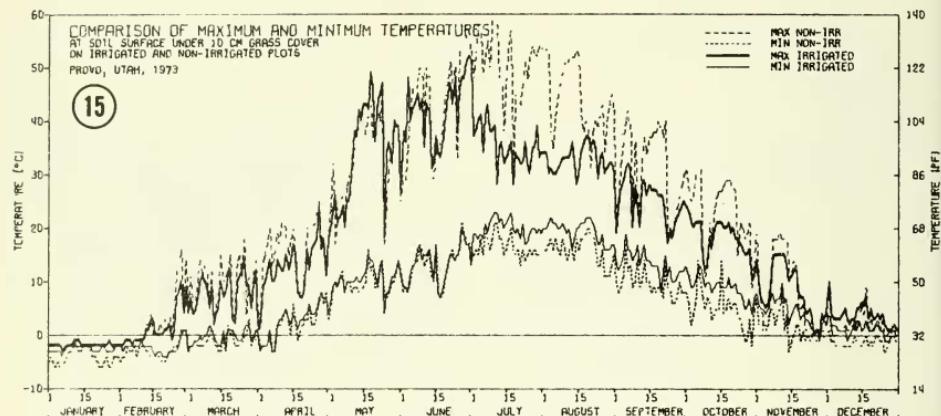
Table 6. 1973 data for time and costs for weather data tabulation and Calcomp plotting programs using the IBM 360/63 installation at Brigham Young University.

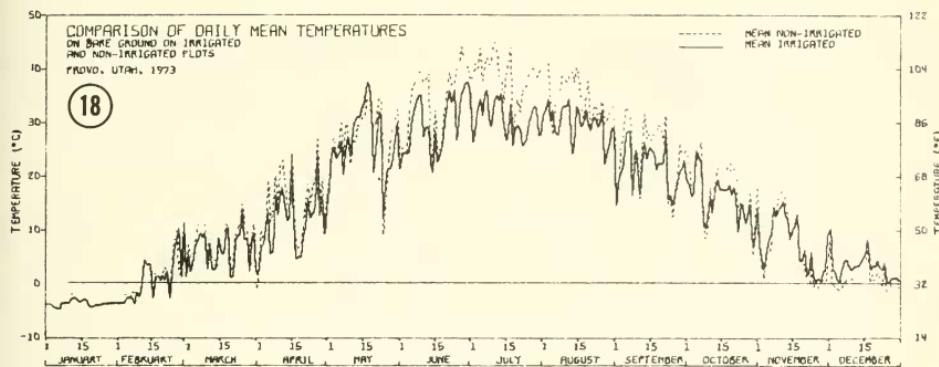
Program	Turn around time	Compiler costs	Run costs	Plotter costs	Total
Weather data tabulation	0.5 hr	\$6.75	\$ 7.50	..	\$14.25
Calcomp graphics	2.0 hr	\$7.00	\$13.00	\$5.00	\$25.00
					\$39.25











logic information from the pasture plots as well as certain calculations and conversions by the computer, the following clarifications may be warranted. All measurements of precipitation as rain are measured and entered in fractions of inches and then converted before tabulation into millimeter units. New snow and total snow cover are similarly handled. Precipitation as snow is calculated as one-tenth that of total snowfall for any one day. Soil moisture samples were determined as described previously by Andersen et al. (1974), with the exception that two samples were taken each week from the irrigated plot—one just prior to sprinkling of the plot and the second 24 hr later. Only one weekly sample was taken from the nonirrigated plot. The weight in grams of each sample was entered as an original wet weight and then as a dry weight determined after 24 hr storage at 105°C.

Programmed formulae calculated the percent soil moisture by dividing the difference in the wet and dry weight for each sample by the dry weight value. This percent was then printed on the first printout page for each of the six months that irrigation was used. The presence or absence of dew on each plot was noted for each morning during those six months and recorded as a "+" when present. Irrigation by sprinkling was performed each Monday during the six-month period and also indicated with a "+" on the appropriate dates.

Relative humidity (RH) maxima and minima, as well as the total number of hours each day at which 98-100 percent RH occurred, were entered and printed

out directly. The evaporating pan on the instrument that measured potential evaporation was filled each morning, and the daily water loss noted for the following 24 hr was entered in mm and also printed out directly. Since evaporation could not be read in freezing weather, the measurement was taken only during May through October, those same months during which the one plot was irrigated. A difficulty ensued whenever rain occurred because the evaporating pan held only 20 mm of water and refilled partially or completely on any day during which rain fell. Thus, any potential evaporation which may have occurred on such days was invariably negated to some degree by the rain that collected in the evaporating pan. Nevertheless, the recording evaporimeter used in the study gave a much more accurate reflection of the potential evaporation with its shallow pan (20 mm) than do the large evaporation tanks used by the U.S. Weather Bureau. In those tanks the water level is frequently 4-6 in (10-15 cm) below the upper rim of the pan and hence protected markedly from the evaporating effect of wind currents.

Any evaluation of daily cloud cover was determined visually each morning and recorded in tenths. The evaluation indicated the approximate portion of the sky that was covered sufficiently with clouds to cast a shadow at the time the instruments were read. It was thus the most subjective of all measurements taken but, nevertheless, provided some estimation of cloud cover in this region. Wind totals were entered in mile units read from the anemometer dial each day, calculated as the difference from the value of the pre-

ceding day, and converted and printed out as kilometers. The final daily wind total for any preceding year is listed as a starting value and included on the control card for the main program.

Maximum and minimum temperatures monitored from a standard weather shelter, from 5 cm beneath soil surface under grass cover, from soil surface under grass cover, or from bare ground were recorded, converted to Celsius if not already in those units, and printed onto the second and third sheets for each month's data. Means and extremes for all values were stored for eventual calculation of totals and grand means for the annual summary pages.

Daily maximum and minimum temperatures were measured in the weather shelter by mercury- and alcohol-filled thermometers as well as by a standard hygrothermograph. Differences noted in the recorded temperatures relate mainly to the longer time lag required by the bimetallic sensor within the thermograph unit.

#### DISCUSSION

The main objective of this paper was to present the computer programs developed for our research on the effect of irrigation on pasture microenvironments. These programs have proved extremely satisfactory to us, and hopefully some sections or subroutines will be of value to others engaged in related research projects. Mitchell and Andersen (1969) reported on a computer program, developed at the University of Illinois at Urbana, for handling meteorologic data collected from grass plots. Certain similarities exist between that program and the one reported here, since the choice of meteorologic instruments and the overall research projects at the two institutions were closely correlated. The program at Illinois, however, was designed to handle some additional measurements not taken in the current study, such as solar radiation. The Illinois study also gave emphasis to conversion data for a series of soil-moisture and soil-temperature measurements obtained through moisture-cell leads (wafers) and built-in thermistor units. The programs developed at BYU use data on soil moisture only from simplified gravimetric measurements but include the techniques designed for Calcomp graphing as well. The advantage

of this plotting program is not only in the funds saved through not having to manually plot, trace, and label all such graphs but more particularly in the marked reduction of errors that invariably accompany the tedious and laborious tasks encountered in manually plotting daily weather data.

The impact of irrigation on the moisture and temperature profiles in central Utah during 1973 was essentially the same as that reported for 1970-72 by Andersen et al. (1974). Grand mean temperatures for 5 cm beneath soil surface under grass cover, at soil surface under grass cover, or on bare soil surface were consistently lower on the irrigated plot than on the nonirrigated area. These temperature differences were most apparent during the warm summer months when irrigation is commonly employed throughout the region. In July, for example, the month during which most yearly maxima were recorded, the average monthly maximum temperatures measured 5 cm beneath soil surface under grass cover on irrigated and nonirrigated plots differed by 6.4 C, by 15.2 C for those measured at soil surface under grass cover, and by 17.9 C on bare ground. During the six months when no irrigation occurred, the differences were not so apparent; hence the grand means for the year do not give an accurate reflection of these temperature ranges for the irrigation season.

The contrast between soil moisture measurements in the two plots was readily apparent for the six months during which soil samples were gravimetrically analyzed for moisture content. The grand mean for the percent soil moisture for that period was 22.7 percent for the samples removed from the irrigated section and 9.4 percent for those from the nonirrigated area.

Other meteorologic measurements which were taken, such as the precipitation pattern for rain or snow, relative humidity, potential evaporation, and wind, were monitored for both sections combined, since the instruments used could not detect differences from microenvironments. The general pattern of these values was similar to that recorded for previous years. The collective data for 1973 emphasize the marked beneficial impact of irrigation in creating favorable microenvironments for living organisms.

## APPENDIX

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C ***** **** * **** * **** * **** * **** * **** * **** * **** * **** * **** *
C *          WEATHER DATA ANALYSIS, PART I
C *
C *      DEVELOPED BY FERRON ANDERSON, BYU
C *      PROGRAMMED BY PAUL ROSS ROPER, ERI
C *
C ***** **** * **** * **** * **** * **** * **** * **** * **** * **** *
0001    INTEGER NDAYS, DAY, DYR, DEWL, IRRG, DEW2, HHUM, LHUM, THRS,
A       CLCV, WIND, OLDW, S2(26,5), MON(12), HOLD, MONTH(13,31) /
B       "JANU", "FEBR", "MARC", "APRI", "MAY ", "JUNE", "JULY",
C       "AUGU", "SEPT", "OCTO", "NOVE", "DECE", "GRAN", "ARY ",
D       "UARY", "H ", "L ", 3* ", "ST ", "EMBE", "BER ",
E       "MBER", "MBER", "D ME", 8* ", "R ", 3* ", "AN "
0002    REAL TPRE, RAIN, PRSN, SNOW, SNCV, MOSI, MOSN, PEVP, IRWW,
A       IRDW, NIWW, NIDW, T(34,16), S1(26,8), S3(13,24),
B       PAGE2(34,12), PAGE3(34,15)
0003    COMMON NDAYS, DAY(31), DYR(31), TPRE(35), RAIN(35), PRSN(35),
A       SNOW(35), SNCV(35), MOSI(35), DEW1(32), IRRG(32),
B       MOSN(35), DEW2(32), HHUM(35), LHUM(35), THRS(35),
C       PEVP(35), CLCV(35), WIND(35)
0004    DATA S1,S2,S3 /208*0.0, 130*0, 312*0.0/
C       TAPE ID
0005    DATA ITAPE /5/
0006    CENT(X) = (X-32.0)*5.0/9.0
C
C       REWIND ITAPE
C
C       LOOK FOR CORRECT YEAR
C
0007    READ(5,200,END=999) NYEAR
0008    READ(ITAPE,200,END=999) IYEAR, TDAYS, MON, OLDW
0009    IF(IYEAR.EQ.NYEAR) GO TO 4
0010    DO 3 I=1,10AYS
0011    READ(ITAPE,200,END=999)
0012    3 CONTINUE
0013    GO TO 2
C
C       PROCESS DATA PAGE BY PAGE
C
0014    4 DO 900 II=1,12
0015    CALL HEAD (IYEAR,II,1,MONTH)
0016    NDAYS = MON(II)
C
C       WRITE PAGE 1 HEADING
C
0017    WRITE(6,120)
0018    DO 10 I=1,NDAYS
0019    READ(ITAPE,201) DAY(I), DYR(I), RAIN(I), SNOW(I), SNCV(I), IRWW,
A       IRDW, DEW1(I), IRRG(I), NIWW, NIDW, DEW2(I),
B       HHUM(I), LHUM(I), THRS(I), PEVP(I), CLCV(I),
C       WIND(I), (T(I,J),J=1,16)
0020    PRSN(I) = SNOW(I) * 0.1
0021    TPRE(I) = RAIN(I) + PRSN(I)
0022    IF(OLDW.GT.WIND(I)) OLDW = OLDW - 1000
0023    HOLD = WIND(I)
0024    WIND(I) = (WIND(I) - OLDW) * 1.6093 + 0.5
0025    OLDW = HOLD
0026    MOSI(I) = 0.0
0027    MOSN(I) = 0.0
0028    IF(IRWW.NE.0.0) MOSI(I) = (IRWW - IRDW) * 100 / IRDW
0029    IF(NIWW.NE.0.0) MOSN(I) = (NIWW - NIDW) * 100 / NIDW
0030    CALL PRINTL (I,II)
0031    PAGE2(I,1) = CENT(T(I,1))
0032    PAGE2(I,2) = CENT(T(I,2))
0033    PAGE2(I,4) = CENT(T(I,3))
0034    PAGE2(I,5) = CENT(T(I,4))
0035    PAGE2(I,7) = T(I,5)
0036    PAGE2(I,8) = T(I,6)
0037    PAGE2(I,10) = T(I,11)

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0038 PAGE2(I,11) = T(I,12)
0039 PAGE3(I,1) = PAGE2(I,1)
0040 PAGE3(I,2) = PAGE2(I,2)
0041 PAGE3(I,4) = T(I,7)
0042 PAGE3(I,5) = T(I,8)
0043 PAGE3(I,7) = T(I,13)
0044 PAGE3(I,8) = T(I,14)
0045 PAGE3(I,10) = T(I,9)
0046 PAGE3(I,11) = T(I,10)
0047 PAGE3(I,13) = T(I,15)
0048 PAGE3(I,14) = T(I,16)
0049
10 CONTINUE
C
C
0050 CALL SUMR (TPRE)
0051 CALL SUMR (RAIN)
0052 CALL SUMR (PRSN)
0053 CALL SUMR (SNOW)
0054 CALL SUMR (SNCV)
0055 CALL SUMR (PEVP)
0056 CALL SUMZ (MOSI)
0057 CALL SUMZ (MOSN)
0058 CALL SUMI (HHUM)
0059 CALL SUMI (LHUM)
0060 CALL SUMI (THRS)
0061 CALL SUMI (CLCV)
0062 CALL SUMI (WIND)
0063 CALL SUMC (IRRG)
0064 CALL SUMC (DEW1)
0065 CALL SUMC (DEW2)
C
C PAGE 1 OF WEATHER DATA
C
0066 IF(II.LT.5.OR.II.GT.10) GOTO 20
0067 WRITE(6,121) TPRE(32), RAIN(32), PRSN(32), SNOW(32), SNCV(32),
A      MOSI(32), DEW1(32), IRRG(32), MOSN(32), DEW2(32),
B      PEVP(32), WIND(32)
0068 WRITE(6,122) (TPRE(I), RAIN(I), PRSN(I), SNOW(I), SNCV(I),
A      MOSI(I), MOSN(I), HHUM(I), LHUM(I), THRS(I),
B      PEVP(I), CLCV(I), WIND(I), I=33,35)
0069 GOTO 30
0070 20 WRITE(6,123) TPRE(32), RAIN(32), PRSN(32), SNOW(32), SNCV(32),
A      WIND(32)
0071 WRITE(6,124) (TPRE(I), RAIN(I), PRSN(I), SNOW(I), SNCV(I),
A      HHUM(I), LHUM(I), THRS(I), CLCV(I), WIND(I), I=33,35)
C
C PAGE 2 OF WEATHER DATA
C
0072 30 CALL HEAD (IYEAR,II,2,MCNTH)
0073 CALL CALC (PAGE2,12)
0074 WRITE(6,130)
0075 DO 31 I=1,NDAYS
0076 31 WRITE(6,131) DAY(I), DYR(I), (PAGE2(I,J),J=1,12)
0077 WRITE(6,132) ((PAGE2(I,J),J=1,12),I=32,34)
C
C PAGE 3 OF WEATHER DATA
C
0078 CALL HEAD (IYEAR,II,3,MONTH)
0079 CALL CALC (PAGE3,15)
0080 WRITE(6,140)
0081 DO 40 I=1,NDAYS
0082 40 WRITE(6,141) DAY(I), DYR(I), (PAGE3(I,J),J=1,15)
0083 WRITE(6,142) ((PAGE3(I,J),J=1,15),I=32,34)
C
C STORE DATA FOR YEARLY SUMMARY PAGES
C
0084 DO 50 J=1,2
K = II * 2 + J - 2
S1(K,1) = TPRE(31+J)
S1(K,2) = RAIN(31+J)
S1(K,3) = PRSN(31+J)
S1(K,4) = SNOW(31+J)
S1(K,5) = SNCV(31+J)
S1(K,6) = MOSI(31+J)

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0092      S1(K,7) = MOSN(31+J)
0093      S1(K,8) = PEVP(31+J)
0094 50  S2(K,5) = WIND(31+J)
0095      S2(K,1) = HHUM(33)
0096      S2(K,2) = LHUM(33)
0097      S2(K,3) = THRS(33)
0098      S2(K,4) = CLCV(33)
0099      DO 51 J=1,12
0100      S3(I1,J) = PAGE2(32,J)
0101 51  S3(I1,J+12) = PAGE3(32,J+3)
0102 900  CONTINUE
C
C
C      YEARLY SUMMARY PAGE
C
0103      DO 54 J=1,8
0104      S1(25,J) = 0.0
0105      S1(26,J) = 0.0
0106      DO 53 I=1,12
0107      IF(J.LT.6) GO TO 53
0108      IF(J.LT.5.OR.J.GT.10) GO TO 53
0109      S2(25,J) = S1(25,J) + S1(I*2-1,J)
0110      S1(26,J) = S1(26,J) + S1(I*2,J)
0111 53  CONTINUE
0112      S1(26,J) = S1(26,J) / 12.0
0113      IF(J.GT.5) S1(26,J) = S1(26,J) * 2.0
0114 54  CONTINUE
0115      DO 56 J=1,5
0116      S2(25,J) = 0
0117      S2(26,J) = 0
0118      DO 55 I=1,12
0119      S2(25,J) = S2(25,J) + S2(I*2-1,J)
0120      S2(26,J) = S2(26,J) + S2(I*2,J)
0121 55  S2(26,J) = S2(26,J) / 12.0
0122      DO 58 J=1,24
0123      S3(13,J) = 0.0
0124      DO 57 I=1,12
0125      S3(13,J) = S3(13,J) + S3(I,J)
0126 58  S3(13,J) = S3(13,J) / 12.0
0127      WRITE(6,160) IYEAR, IYEAR
0128      WRITE(6,161)
C
C      WRITE SUMMARY PAGE
C
0129      DO 61 I=1,12
0130      K = I * 2 - 1
0131      L = K + 1
0132      IF(I.LT.5.OR.I.GT.10) GO TO 60
0133      WRITE(6,162) (MONTH(I,J),J=1,3), (S1(K,J),J=1,5), S1(K,8), S2(K,5),
A          (S1(L,J),J=1,7), (S2(L,J),J=1,3), S1(L,8), S2(L,4),
B          S2(L,5)
0134      GOTO 61
0135 60  WRITE(6,163) (MONTH(I,J),J=1,3), (S1(K,J),J=1,5), S2(K,5),
A          (S1(L,J),J=1,5), (S2(L,J),J=1,5)
0136 61  CONTINUE
0137      WRITE(6,164) (S1(25,J),J=1,5), S1(25,8), S2(25,5),
A          (S1(26,J),J=1,7), (S2(26,J),J=1,3), S1(26,8),
B          (S2(26,J),J=4,5)
C
0138      WRITE(6,165) IYEAR, IYEAR
0139      WRITE(6,166)
0140      WRITE(6,167) ((MONTH(I,J),J=1,3), (S3(I,K),K=1,12), I=1,13)
0141      WRITE(6,168)
0142      WRITE(6,167) ((MONTH(I,J),J=1,3), (S3(I,K),K=13,24), I=1,13)
0143      WRITE(6,169)
0144      GOTO 1
C
C
0145      999 STOP
0146 120  FORMAT('1',T23,'PRECIPITATION (MM)',T65,'SOIL MOISTURE',T90,
A          'RELATIVE',/,T7,T7,'DAY',T90,'HUMIDITY     HRS OF    POT',5X,
B          'CLOUD',/,T7,'OF      TOTAL RAIN',3(4X,'SNOW'),T60,
C          'IRRIGATED',T76,'NON-IRRIG',T102,'98-100    EVAP',4X,
D          'COVER WIND',/, DAY YEAR',3(4X,'PREC'),'FALL',4X,
E          'COVER',5X,'PERCENT DEW IRR* PERCENT DEW MAX MIN',4X,
F          'REL-HUM   (MM)    (0-10)  (KM)',//)

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0147          121 FORMAT(''--TOTALS    ',5F8.1,F11.1,214,F10.1,I4,T109,F8.1,7X,I8)
0148          122 FORMAT('OMEANS   ',5F8.1,F11.1,T73,F8.1,T78,215,I8,F11.1,I7,I8,/,,
0149          A      ''OEXTREMES',/,
0150          B      '' HIGH',5F8.1,F11.1,T73,F8.1,T78,215,I8,F11.1,I7,I8,/,,
0151          C      '' LOW ',5F8.1,F11.1,T73,F8.1,T78,215,I8,F11.1,I7,I8,/,,
0152          D      ''-* DATE OF IRRIGATION (MAY THROUGH OCTOBER)'')
0153          123 FORMAT(''--TOTALS    ',5F8.1,T124,18)
0154          124 FORMAT('OMEANS   ',5F8.1,T88,215,18,11X,I7,I8,/,''OEXTREMES',/,,
0155          A      '' HIGH',5F8.1,T88,215,18,11X,I7,I8,/,,
0156          B      '' LOW ',5F8.1,T88,215,18,11X,I7,I8,/,''-* DATE OF ''
0157          C      ''IRRIGATION (MAY THROUGH OCTOBER)'')
0158          130 FORMAT(31X,'WEATHER SHELTER TEMPERATURES',32X,'5 CM BENE
0159          AATH SOIL SURFACE',//,5X,'DAY',13X,'THERMOMETER',16X,'HYGROTHERMOGR
0160          BAPH',16X,'IRRIGATED',18X,'NON-IRRIGATED',/,9X,'OF',/,5X,
0161          C ''DAY YAF',4(8X,'MAX.      MIN.      MEAN'),/)
0162          131 FORMAT(5X,A2,2X,A3,4(5X,3F8.1))
0163          132 FORMAT(''-- MEANS  ',4(5X,3F8.1),/,0 EXTREMES',/,,
0164          A      8X,'HIGH',4(5X,2F8.1,4X,A4),/,8X,'LOW ',4(5X,2F8.1,4X,A4),
0165          B      /,- ALL TEMPERATURES IN DEGREES CELSIUS')
0166          140 FORMAT(16X,'WEATHER SHELTER',15X,'SOIL SURFACE UNDER GRASS COVER',
0167          A 27X,'BAKE SOIL SURFACE',//,5X,'DAY',10X,'THERMOMETER',4X,
0168          B 2(11X,'IRRIGATED',14X,'NON-IRRIGATED',3X),/,5X,'OF',/,,
0169          C '' DAY YEAR',6X,'MAX.      MIN.      MEAN',4(7X,'MAX.      MIN.      MEAN'),/)
0170          141 FORMAT(1X,A2,2X,A3,5(4X,3F7.1))
0171          142 FORMAT(''--MEANS  ',5(4X,3F7.1),/,''OEXTREMES',/,'' HIGH',
0172          A 5(4X,2F7.1,3X,A4),/,'' LOW ',5(4X,2F7.1,3X,A4),/,,
0173          B ''-ALL TEMPERATURES IN DEGREES CELSIUS')
0174          160 FORMAT(''1 ''I4,' SUMMARY - PRECIPITATION',95X,'PART 1'',//,51X,
0175          A ''I4,' SUMMARY OF METEOROLOGIC DATA',/,55X,'BYU PARASITOLOGY STATI
0176          BON',/,61X,'PROVO, UTAH',//)
0177          161 FORMAT(32X,*PRECIPITATION (MM)',T66,'SOIL MOISTURE',T84,
0178          A ''RELATIVE',/,T68,'(PERCENT)',T84,'HUMIDITY',T97,
0179          B ''HRS OF POT CLOUD',/,24X,'TOTAL RAIN',
0180          C 3(' SNOW'),T97,'98-100 EVAP COVER WIND',/,3X,
0181          D ''MONTH',16X,3('PREC   '),''FALL COVER IRRG ',
0182          E ''NON-IRRIG MAX MIN REL HUM (MM) (0-10) (KM) ')
0183          162 FORMAT(0 ''3A4,'TOTAL',5F8.1,5I6X,'--'),F8.1,oX,'--',18,/,,
0184          A 15X,'MEAN ',7F8.1,3I8,F8.1,218)
0185          163 FORMAT(0 ''3A4,'TOTAL',5F8.1,5I6X,'--'),6X,'ND',6X,'--',18,/,,
0186          A 15X,'MEAN ',5F8.1,2(6X,'ND'),3I8,6X,'ND',218)
0187          164 FORMAT(''-- YEARLY TOTAL  ',5F8.1,5(6X,'--'),F8.1,'**',5X,'--',
0188          A 18,/,0 GRAND MEAN   ,5F8.1,1X,2(F7.1,'**'),17,218,
0189          B F8.1 '**',17,18,/,0 ND = NOT DETERMINED',/, '' * CALCULATE
0190          CD 1 MAY THROUGH 31 OCTOBER ONLY')
0191          165 FORMAT(''1 ''I4,' SUMMARY - TEMPERATURES',95X,'PART 2'',//,51X,
0192          A ''I4,' SUMMARY OF METEOROLOGIC DATA',/,55X,'BYU PARASITOLOGY STATIO
0193          BON',/,61X,'PROVO, UTAH',//)
0194          166 FORMAT(34X,*WEATHER SHELTER TEMPERATURES',32X,'5 CM BENE
0195          AATH SOIL SURFACE',//,28X,'THERMOMETER',16X,'HYGROTHERMOGRAPH',16X,
0196          B 'IRRIGATED',18X,'NON-IRRIGATED',/,0 MONTH',8X,4(8X,'MAX.      MIN.
0197          C MEAN'),/)
0198          167 FORMAT(12(' ''3A4,4(5X,3F8.1)/),0 ''3A4,4(5X,3F9.1),//)
0199          168 FORMAT(''--32X,'SOIL SURFACE UNDR GRASS COVER',34X,'BARE SOIL SUR
0200          A'FACE',//,11X,2(18X,'IRRIGATED',18X,'NON-IRRIGATED'),/,0 MONTH',
0201          B 7X,4(9X,'MAX.      MIN.      MEAN'),/)
0202          169 FORMAT(''-- ALL TEMPERATURES IN DEGREES CELSIUS',/,1')
0203          200 FORMAT(2014)
0204          201 FORMAT(A2,A3,F3.2,4F3.1,2A1,2F3.1,A1,2I3,12,F3.1,I2,I3,
0205          A   ,5X,16F3.0)
0206          END

0207          SUBROUTINE HEAD (IYEAR,M,IPG,MONTH)
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1679         
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```

0005      WRITE(6,100) (MONTH(M,I),I=1,3), IYEAR, IPG, (MONTH(M,I),I=1,3),
0006      A          IYEAR
0007      C
0008      ENTRY PRINTL (I,II)
0009      C
0010      PRINTL FORMATS DAILY DATA FOR PRINTING
0011      C
0012      INCLUDES SCALING AND SUPPRESSING ZERO RESULTS
0013      C
0014      CALL ALPHA (TPRE(I), LINE(1), 25.4)
0015      CALL ALPHA (RAIN(I), LINE(3), 25.4)
0016      CALL ALPHA (PRSN(I), LINE(5), 25.4)
0017      CALL ALPHA (SNOW(I), LINE(7), 25.4)
0018      CALL ALPHA (SNCV(I), LINE(9), 25.4)
0019      CALL ALPHA (MOSI(I), LIN1(I), 1.0)
0020      CALL ALPHA (MOSN(I), LIN2(I), 1.0)
0021      IF(II.LT.5.OR.II.GT.10) GOTO 2
0022      WRITE(6,101) DAY(I), DYR(I), LINE, LIN1, DEW1(I), IRRG(I),
0023      A           LIN2, DEW2(I), HHUM(I), LHUM(I), THRS(I), PEVP(I),
0024      B           CLCV(I), WIND(I)
0025      RETURN
0026      2 WRITE(6,102) DAY(I), DYR(I), LINE, HHUM(I), LHUM(I), THRS(I),
0027      A           CLCV(I), WIND(I)
0028      RETURN
0029      C
0030      100 FORMAT('1  ',2A4,A2,I4,108X,'PAGE ',I1,///,49X,'MONTHLY SUMMARY O
0031      AF METEOROLOGIC DATA',//,55X,'BYU PARASITOLOGY STATION',//,61X,
0032      B'PROVO, UTAH',//,60X,2A4,A2,I4,/)
0033      101 FORMAT(1X,A2,3X,A4,5(2X,A4,A2),6X,A4,A2,2(3X,A1),4X,A4,A2,3X,A1,
0034      A           3X,2I5,I8,F1.1,I7,I8)
0035      102 FORMAT(1X,A2,3X,A4,5(2X,A4,A2),T88,2I5,I8,T117,I7,I8)
0036      END

0001      SURROUNTING ALPHA (R,C,S)
0002      C
0003      CCNVERT R SCALED BY S INTO ALPHA CHARACTERS AND RETURN IN C.
0004      C
0005      (RETURNS BLANK CHARACTERS IF ZERO)
0006      C
0007      INTEGER NI(301) /* 0*,* 1*,* 2*,* 3*,* 4*,* 5*,* 6*,*
A      1   7*,* 8*,* 9*,* 10*,* 11*,* 12*,* 13*,* 14*,* 15*,*
B      16*,* 17*,* 18*,* 19*,* 20*,* 21*,* 22*,* 23*,* 24*,*
C      25*,* 26*,* 27*,* 28*,* 29*,* 30*,* 31*,* 32*,* 33*,*
D      34*,* 35*,* 36*,* 37*,* 38*,* 39*,* 40*,* 41*,* 42*,*
E      43*,* 44*,* 45*,* 46*,* 47*,* 48*,* 49*,* 50*,* 51*,*
F      52*,* 53*,* 54*,* 55*,* 56*,* 57*,* 58*,* 59*,* 60*,*
G      61*,* 62*,* 63*,* 64*,* 65*,* 66*,* 67*,* 68*,* 69*,*
H      70*,* 71*,* 72*,* 73*,* 74*,* 75*,* 76*,* 77*,* 78*,*
I      79*,* 80*,* 81*,* 82*,* 83*,* 84*,* 85*,* 86*,* 87*,*
J      88*,* 89*,* 90*,* 91*,* 92*,* 93*,* 94*,* 95*,* 96*,*
K      97*,* 98*,* 99*,* 100*,* 101*,* 102*,* 103*,* 104*,* 105*,*
L      106*,* 107*,* 108*,* 109*,* 110*,* 111*,* 112*,* 113*,* 114*,*
M      115*,* 116*,* 117*,* 118*,* 119*,* 120*,* 121*,* 122*,* 123*,*
N      124*,* 125*,* 126*,* 127*,* 128*,* 129*,* 130*,* 131*,* 132*,*
O      133*,* 134*,* 135*,* 136*,* 137*,* 138*,* 139*,* 140*,* 141*,*
P      142*,* 143*,* 144*,* 145*,* 146*,* 147*,* 148*,* 149*,* 150*/,
0008      INTEGER N3(275) /* 151*,* 152*,* 153*,* 154*,* 155*,* 156*,* 157*,*
A      158*,* 159*,* 160*,* 161*,* 162*,* 163*,* 164*,* 165*,* 166*,*
B      167*,* 168*,* 169*,* 170*,* 171*,* 172*,* 173*,* 174*,* 175*,*
C      176*,* 177*,* 178*,* 179*,* 180*,* 181*,* 182*,* 183*,* 184*,*
D      185*,* 186*,* 187*,* 188*,* 189*,* 190*,* 191*,* 192*,* 193*,*
E      194*,* 195*,* 196*,* 197*,* 198*,* 199*,* 200*,* 201*,* 202*,*
F      203*,* 204*,* 205*,* 206*,* 207*,* 208*,* 209*,* 210*,* 211*,*
G      212*,* 213*,* 214*,* 215*,* 216*,* 217*,* 218*,* 219*,* 220*,*
H      221*,* 222*,* 223*,* 224*,* 225*,* 226*,* 227*,* 228*,* 229*,*
I      230*,* 231*,* 232*,* 233*,* 234*,* 235*,* 236*,* 237*,* 238*,*
J      239*,* 240*,* 241*,* 242*,* 243*,* 244*,* 245*,* 246*,* 247*,*
K      248*,* 249*,* 250*,* 251*,* 252*,* 253*,* 254*,* 255*,* 256*,*
L      257*,* 258*,* 259*,* 260*,* 261*,* 262*,* 263*,* 264*,* 265*,*
M      266*,* 267*,* 268*,* 269*,* 270*,* 271*,* 272*,* 273*,* 274*/,
0009      EQUIVALENCE (NI(152),N3(1))
0010      INTEGER N2(11) /* 0*,* 1*,* 2*,* 3*,* 4*,* 5*,* 6*,* 7*,* 8*,*
A          * 9*/, BLANK/*  /, C(2)
0011      R = R * S
0012      C(1) = BLANK

```

```

0008      C(2) = BLANK
0009      R1 = R + 0.05
0010      I1 = RI
0011      I2 = (RI - I1) * 10
0012      IF(I1.EQ.0.AND.I2.EQ.0) RETURN
0013      C(1) = N1([I1+1]
0014      C(2) = N2([I2+1]
0015      RETURN
0016      END

0001      SUBROUTINE CALC (X,N)
C
C      CALC PROCESSES REAL DATA IN X AND RETURNS SUMS IN ROW 32,
C      MEANS IN ROW 33, MINIMUMS IN ROW 34, AND MAXIMUMS IN ROW 35.
C
0002      REAL X(34,N), S(35)
0003      REAL BLANK/*      */
0004      LOGICAL ZERO
0005      COMMON NDAYS
0006      DO 10 J=1,N
0007      X(32,J) = 0.0
0008      X(33,J) = -100.0
0009      X(34,J) = 1000.0
0010      DO 10 I=1,NDAYS
0011      IF(MOD(J,3).NE.0) GO TO 9
0012      X(I,J) = (X(I,J-2) + X(I,J-1)) / 2.0
0013      X(32,J) = X(32,J) + X(I,J)
0014      GO TO 10
0015      9 X(32,J) = X(32,J) + X(I,J)
0016      IF(X(33,J).LT.X(I,J)) X(33,J) = X(I,J)
0017      IF(X(34,J).GT.X(I,J)) X(34,J) = X(I,J)
0018      10 CONTINUE
0019      DO 11 J=1,N
0020      X(32,J) = X(32,J) / NDAYS
0021      IF(MOD(J,3).NE.0) GO TO 11
0022      X(33,J) = BLANK
0023      X(34,J) = BLANK
0024      11 CONTINUE
0025      RETURN
C
0026      ENTRY SUMR (S)
C
C      PROCESS REAL DATA IN ARRAY S AND RETURN SUM IN S(32), MEAN IN
C      S(33), MINIMUM IN S(34), AND MAXIMUM IN S(35).
C
0027      ZERO = .FALSE.
0028      S(32) = 0.0
0029      S(33) = 0.0
0030      S(34) = -1000.0
0031      S(35) = 1000.0
0032      N = 0
0033      DO 2 I=1,NDAYS
0034      IF(ZERO.AND.S(I).LT.0.001) GOTO 2
0035      N = N + 1
0036      S(32) = S(32) + S(I)
0037      IF(S(34).LT.S(I)) S(34) = S(I)
0038      IF(S(35).GT.S(I)) S(35) = S(I)
0039      2 CONTINUE
0040      IF(N.EQ.0) RETURN
0041      S(33) = S(32) / N
0042      RETURN
C
0043      ENTRY SUMZ (S)
0044      ZERO = .TRUE.
0045      GOTO 1
0046      END

0001      SUBROUTINE SUMI (IY)
C
C      PROCESS INTEGER DATA IN ARRAY IY AND RETURN SUM IN IY(32),
C      MEAN IN IY(33), MINIMUM IN IY(34), AND MAXIMUM IN IY(35).
C
0002      INTEGER IY(35), PLUS/*+*/

```

```

0003      COMMON NDAYS
0004      IY(32) = 0
0005      IY(34) = 0
0006      IY(35) = 1000
0007      DO 13 I=1,NDAYS
0008      IY(32) = IY(32) + IY(I)
0009      IF(IY(34).LT.IY(I)) IY(34) = IY(I)
0010      IF(IY(35).GT.IY(I)) IY(35) = IY(I)
0011      13 CONTINUE
0012      IY(33) = IY(32)/NDAYS + 0.5
0013      RETURN
C
C
0014      ENTRY SUMC {IY}
C
C      PROCESS CHARACTER DATA IN ARRAY IY AND RETURN THE NUMBER OF ++
C      IN IY(32).
C
0015      IY(32) = 0
0016      DO 14 I=1,NDAYS
0017      IF(IY(I).EQ.PLUS) IY(32) = IY(32) + 1
0018
0019      14 CONTINUE
0020      RETURN
END

```

```

C ***** ****
C *          *
C *          WEATHER DATA ANALYSIS, PART II
C *          *
C *          PROGRAMMED BY PAUL ROSS ROPER
C *          EYRING RESEARCH INSTITUTE, 1974
C *          *
C ***** ****
C
C
C      DECK FORMAT      CONTROL CARD
C      DATA HEADER      (ON TAPE IF DESIRED)
C      DATA             (ON TAPE IF DESIRED)
C
C      1. CONTROL CARD    COLUMNS   DESCRIPTION
C                         1-4       YEAR
C                         5-8       DESIRED GRAPH BY NUMBER
C                         9-12 ...  13 GRAPHS POSSIBLE
C
C      2. DATA HEADER     1-4       YEAR OF DATA
C                         5-8       NUMBER OF DAYS IN YEAR
C                         9-12     LAST WIND READING OF PREVIOUS YEAR
C
C      3. DATA            SEE PUBLICATION FOR CARD COLUMNS AND DATA
C                          DESCRIPTION.
C
C

```

```

0001
A      COMMON /PLOTO/ XPLT(366), ITAPE
B      /PLOT1/ RAIN(366), XIRR(366), YIRR(366), YNIR(366)
C      /PLOT2/ SNOW(366)
D      /PLOT3/ YHHD(366), YLHD(366)
E      /PLOT4/ HUMD(366)
F      /PLOT5/ EVAP(366)
F      /PLOT6/ WIND(366)
G      /PLOT7/ YMAX(366), YMIN(366)
H      /PLOT8/ YH5C(366), YL5C(366), ZH5C(366), ZL5C(366)
I      /PLOT9/ YHAL(366), YLA1(366)
J      /PLOT10/ YHSS(366), YLSS(366), ZHSS(366), ZLSS(366)
K      /PLOT11/ YHA2(366), YLA2(366)
L      /PLOT12/ YH8G(366), YLBG(366), ZHBG(366), ZLBG(366)
M      /PLOT13/ YHA3(366), YLA3(366)
A      COMMON /LABELS/ AX1(37), AY1(37), AX2(73), AY2(73),
B      BX(4), BY(4), XL(4), YL(4),
B      RC1(7), LC1(7), RC2(13), LC2(13),
C      RC3(11), LC3(11), RC4(13), LC4(13),
D      RC5(11), LC5(18), RC6(8), LC6(16),
E      RC7(12), LC7(24)
C
C      CREATE A DEGREE SYMBOL

```

```

0003      DIMENSION      DEG(3), O(3), NGRAPH(14)
0004      DATA  DEG      /Z05361727, Z36352414, Z05061727/, J /Z91/
0005      DATA  O       /Z01061737, Z46413910, Z01061737/, K /Z06/
0006      CALL SYMBL5 (J,9,DEG)
0007      CALL SYMBL5 (K,9,O)
0008      REWIND ITAPE

C
C      READ CONTROL CARD
C
0009      100 READ(5,200,END=999) NYEAR, NGRAPH
0010      200 FORMAT(15I4)
0011      NUM = 0

C
C      READ ONE YEAR'S DATA
C
0012      CALL READC (NYEAR,NDAYS)
C
C      CONTROL LOOP
C
0013      300 NUM = NUM + 1
0014      M = NGRAPH(NUM)
0015      GO TO (1,2,3,4,5,6,7,8,9,10,11,12,13), M
0016      GO TO 100
0017      999 CALL PLOT   (12.0,0.0,-3)
0018      STOP

C
C
C*****PLOT 1*****PRECIPITATION AND SOIL MOISTURE
C
C
0019      1 CALL AXES  (3.0,RC1,4,0.5,7,1,LC1,4,0.5,7,1)
0020      CALL SCALE (RAIN,NEAYS,3.00, 3.0, 0.0, 2)
0021      CALL SYMBL4 (-0.24,1.2,0.07,'MILLIMETERS',90.0,11)
0022      CALL SYMBL4 (0.212.8,0.1,'PRECIPITATION',0.0,13)
0023      CALL SYMBL4 (1.39,2.8,0.07,'AND',0.0,3)
0024      CALL SYMBL4 (1.64,2.8,0.1,'SOIL MOISTURE',0.0,13)
0025      CALL DATE  (NYEAR,0.2,2.65)
0026      CALL BAR   (XPLT,RAIN,NDAYS)
0027      CALL SYMBL4 (8.21,1.3,0.07,'INCHES',90.0,6)
0028      CALL MOIST
0029      GO TO 300

C
C
C*****PLOT 2*****SNOW COVER
C
C
0030      2 CALL AXES  (3.0,RC2,4,0.25,13,1,LC2,4,0.25,13,1)
0031      CALL SCALE (SNOW,NDAYS,3.00, 12.0, 0.0, 3)
0032      CALL SYMBL4 (-0.27,1.2,0.07,'MILLIMETERS',90.0,11)
0033      CALL SYMBL4 (0.2,2.8,0.1,'SNOW COVER',0.0,10)
0034      CALL DATE  (NYEAR,0.2,2.65)
0035      CALL BAR   (XPLT,SNOW,NDAYS)
0036      CALL SYMBL4 (8.23,1.3,0.07,'INCHES',90.0,6)
0037      GO TO 300

C
C
C*****PLOT 3*****RELATIVE HUMIDITY IN WEATHER SHELTER
C
C
0038      3 CALL AXES  (3.0,RC3,4,0.25,11,1,LC3,4,0.25,11,1)
0039      CALL SCALE (YHHD,NDAYS,2.49,100.0, 0.0, 4)
0040      CALL SCALE (YLHD,NEAYS,2.49,100.0, 0.0, 5)
0041      CALL SYMBL4 (-0.25,1.1,0.07,'PERCENT',90.0,7)
0042      CALL SYMBL4 (1.2,2.8,0.1,'RELATIVE HUMIDITY IN WEATHER SHELTER',
0043                  0.0,36)
0044      CALL DATE  (NYEAR,0.2,2.65)
0045      CALL LEGEND (1,7,1,0,8)
0046      CALL LINES (XPLT,YHHD,NDAYS,0.01,2)
0047      CALL DASH  (XPLT,YLHD,NDAYS,1,0,3)
0048      CALL SYMBL4 (8.25,1.1,0.17,'PERCENT',90.0,7)
0049      GO TO 300

```

```

*****PLOT 4*****DAILY DURATION OF RELATIVE HUMIDITY
C          DAILY DURATION OF RELATIVE HUMIDITY
C
0049    4 CALL AXES {3.0,RC4,4,0.21,13,1,LC4,4,0.21,13,1}
0050    CALL SCALE (HUMD,NDAYS,2,49, 24.0, 0.0, 6)
0051    CALL SYMBL4 (-0.22,1.5,0.07,'HOURS',90.0,5)
0052    CALL SYMBL4 (0.2,2.8,0.1,'DAILY DURATION OF RELATIVE HUMIDITY AT 9
AB-100%', 0.0,46)
0053    CALL DATE (NYEAR,C,2,2,65)
0054    CALL BAR (XPLT,HUMD,NDAYS)
0055    CALL SYMBL4 (8.23,1.5,0.07,'HOURS',90.0,5)
0056    GO TO 300
C
C
*****PLOT 5*****POTENTIAL EVAPORATION
C          POTENTIAL EVAPORATION
0057    5 CALL AXES {3.0,RC5,4,0.28,11,1,LC5,5,0.35,18,2}
0058    CALL SCALE (EVAP,NDAYS,3,00, 20.0, 0.0, 7)
0059    CALL SYMBL4 (-1.23,1.2,0.07,'MILLIMFTFRS',90.0,11)
0060    CALL SYMBL4 (0.2,2.8,0.1,'POTENTIAL EVAPORATION',0.0,21)
0061    CALL DATE (NYEAR,0.2,2,65)
0062    CALL SYMBL4 (2.0,0.5,0.07,'STARTED',0.0,7)
0063    J = NDAYS - 244
0064    CALL LINES (XPLT(J),EVAP(J),184,0.01,2)
0065    CALL SYMBL4 (7.0,0.5,0.07,'STOPPED',0.0,7)
0066    CALL SYMBL4 (8.30,1.3,0.07,'INCHES',90.0,6)
0067    GO TO 300
C
C
*****PLOT 6*****TOTAL WIND 1 METER ABOVE GROUND
C          TOTAL WIND 1 METER ABOVE GROUND
C
0068    6 CALL AXES {3.0,RC6,4,0.42,8,1,LC6,5,0.42,16,2}
0069    CALL SCALE (WIND,NDAYS,2,94,175.0, 0.0, 8)
0070    CALL SYMBL4 (-0.29,1.2,0.07,'KILOMETERS',90.0,10)
0071    CALL SYMBL4 (0.2,2.8,0.1,'TOTAL WIND 1 METER ABOVE GROUND',0.0,31)
0072    CALL DATE (NYEAR,0.2,2,65)
0073    CALL LINES (XPLT,WIND,NDAYS,0.01,2)
0074    CALL SYMBL4 (8.3,1.4,0.07,'MILES',90.0,5)
0075    GO TO 300
C
C
*****PLOT 7*****TEMPERATURE IN WEATHER SHELTER
C          TEMPERATURE IN WEATHER SHELTER
C
0076    7 CALL AXES {4.0,RC7(1),4,0.5,9,1,LC7(1),5,0.5,18,2}
0077    CALL SCALE (YMAX,NCAYS,4.00,122.0,-22.0, 9)
0078    CALL SCALE (YMIN,NCAYS,4.00,122.0,-22.0,10)
0079    CALL SYMBL4 (-0.25,1.2,0.07,'TEMPERATURE (JC)',90.0,16)
0080    CALL SYMBL4 (0.2,3.7,0.1,'TEMPERATURE IN WEATHER SHELTER',0.0,30)
0081    CALL DATE (NYEAR,0.2,3,55)
0082    CALL LEGEND (1.7,0.3,7)
0083    CALL ZERO (1.5),
0084    CALL SYMBL4 (8.32,1.2,0.07,'TEMPERATURE (JF)',90.0,16)
0085    CALL LINES (XPLT,YMAX,NDAYS,0.01,2)
0086    CALL DASH (XPLT,YMIN,NDAYS,0.02)
0087    GO TO 300
C
C
*****PLOT 8*****COMPARISON OF MAX AND MIN TEMP 5 CM UNDER 10 CM GRASS
C          COMPARISON OF MAX AND MIN TEMP 5 CM UNDER 10 CM GRASS
C
0088    8 CALL AXES {3.0,RC7(3),4,0.6,6,1,LC7(5),5,0.6,12,2}
0089    CALL SCALE (YH5C,NDAYS,3,00, 40.0,-10.0,11)
0090    CALL SCALE (YL5C,NDAYS,3,00, 40.0,-10.0,12)
0091    CALL SCALE (ZH5C,NDAYS,3,00, 40.0,-10.0,13)
0092    CALL SCALE (ZL5C,NDAYS,3,00, 40.0,-10.0,14)
0093    CALL SYMBL4 (-0.25,1.0,0.07,'TEMPERATURE (JC)',90.0,16)
0094    CALL SYMBL4 (0.2,2.8,0.1,'COMPARISON OF MAXIMUM AND MINIMUM TEMPER
AATURES', 0.0,46)

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0095      CALL SYMBL4 (0.2,2.7,0.07,'5 CM DEEP IN SOIL UNDER 10 CM GRASS COV
AER',
0096      CALL SYMBL4 (0.2,2.6,0.07,'ON IRRIGATED AND NON-IRRIGATED PLOTS',
A     0.0,36)
0097      CALL DATE (NYEAR,0.2,2.45)
0098      CALL LEGEND (2.0,75,2.8)
0099      CALL ZERO (0.6)
0100      CALL SYML4 (8.32,1.0,0.07,'TEMPERATURE (JF)',90.0,16)
0101      CALL LINES (XPLT,YH5C,NDAYS,0.01,3)
0102      CALL LINE (XPLT,YL5C,NDAYS,1)
0103      CALL DASH (XPLT,ZH5C,NDAYS,0.04)
0104      CALL DASH (XPLT,ZL5C,NDAYS,0.02)
0105      GO TO 300

C
C
C*****PLOT 9*****COMPARISON OF MEANS 5 CM UNDER 10 CM GRASS
C
C
0106      9 CALL AXES (3.0,RC7(3),4.0,0.6,6,1,LC7(5),5,0.6,12,2)
0107      CALL SCALE (YH1,NDAYS,3.00, 40.0,-10.0,15)
0108      CALL SCALE (YL1,NDAYS,3.00, 40.0,-10.0,16)
0109      CALL SYMBL4 (-0.25,1.0,0.07,'TEMPERATURE (JC)',90.0,16)
0110      CALL SYMBL4 (0.2,2.8,0.1,'COMPARISON OF DAILY MEAN TEMPERATURES',
A     0.0,37)
0111      CALL SYMBL4 (0.2,2.7,0.07,'5 CM DEEP IN SOIL UNDER 10 CM GRASS COV
AER',
0112      CALL SYMBL4 (0.2,2.6,0.07,'ON IRRIGATED AND NON-IRRIGATED PLOTS',
A     0.0,36)
0113      CALL DATE (NYEAR,0.2,2.45)
0114      CALL LEGEND (3.6,5,2.8)
0115      CALL ZERO (0.6)
0116      CALL LINES (XPLT,YH1,NDAYS,0.01,2)
0117      CALL DASH (XPLT,YL1,NDAYS,0.02)
0118      CALL SYMBL4 (8.32,1.0,0.07,'TEMPERATURE (JF)',90.0,16)
0119      GO TO 300

C
C
C*****PLOT 10*****COMPARISON OF MAX AND MIN TEMP AT SOIL SURFACE
C
C
0120      10 CALL AXES (3.5,RC7(3),4.0,0.5,8,1,LC7(5),5,0.5,16,2)
0121      CALL SCALE (YHSS,NDAYS,3.50, 60.0,-10.0,17)
0122      CALL SCALE (YLSS,NDAYS,3.50, 60.0,-10.0,18)
0123      CALL SCALE (ZHSS,NDAYS,3.50, 60.0,-10.0,19)
0124      CALL SCALE (ZLSS,NDAYS,3.50, 60.0,-10.0,20)
0125      CALL SYMBL4 (-0.25,1.3,0.07,'TEMPERATURE (JC)',90.0,16)
0126      CALL SYMBL4 (0.2,3.3,0.1,'COMPARISON OF MAXIMUM AND MINIMUM TEMPER
ATURES',
A     0.0,46)
0127      CALL SYMBL4 (0.2,2.3,2.0,0.07,'AT SOIL SURFACE UNDER 10 CM GRASS COVER
A',
A     0.0,39)
0128      CALL SYMBL4 (0.2,2.3,1.0,0.07,'ON IRRIGATED AND NON-IRRIGATED PLOTS',
A     0.0,36)
0129      CALL DATE (NYEAR,0.2,2.95)
0130      CALL LEGEND (2.6,75,3.3)
0131      CALL ZERO (0.5)
0132      CALL SYMBL4 (8.32,1.3,0.07,'TEMPERATURE (JF)',90.0,16)
0133      CALL LINES (XPLT,YHSS,NDAYS,0.01,3)
0134      CALL LINE (XPLT,YLSS,NDAYS,1)
0135      CALL DASH (XPLT,ZHSS,NDAYS,0.04)
0136      CALL DASH (XPLT,ZLSS,NDAYS,0.02)
0137      GO TO 300

C
C
C*****PLOT 11*****COMPARISON OF MEANS AT SOIL SURFACE
C
C
0138      11 CALL AXES (3.0,RC7(3),4.0,0.5,7,1,LC7(5),5,0.5,14,2)
0139      CALL SCALE (YH2,NDAYS,3.00, 50.0,-17.0,21)
0140      CALL SCALE (YL2,NDAYS,3.00, 50.0,-10.0,22)
0141      CALL SYMBL4 (-0.25,1.0,0.07,'TEMPERATURE (JC)',90.0,16)
0142      CALL SYMBL4 (0.2,2.8,0.1,'COMPARISON OF DAILY MEAN TEMPERATURES',
A     0.0,37)
0143      CALL SYMBL4 (0.2,2.7,0.07,'AT SOIL SURFACE UNDER 10 CM GRASS',
A     0.0,33)

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0144      CALL SYMRL4 (0.2,2.6,0.07,'ON IRRIGATED AND NON-IRRIGATED PLOTS',
A          0.0,36)
0145      CALL DATE  (NYEAR,0.2,2.45)
0146      CALL LEGEND (3.6,5,2.8)
0147      CALL ZERO  (0.5)
0148      CALL SYMRL4 (8.32,1.0,0.07,'TEMPERATURE (JF)',90.0,16)
0149      CALL LINES (XPLT,YHA2,NDAYS,0.01,2)
0150      CALL DASH  (XPLT,YLA2,NDAYS,0.02)
0151      GO TO 300
C
C
C*****PLOT 12*****COMPARISON OF MAX AND MIN ON BARE GROUND
C
C
0152      12 CALL AXES  (5.0,PC7(2),4.0,5,11,1,LC7(3),5,0.5,22,2)
0153      CALL SCALE (YH8G,NDAYS,5.00, 80.0,-20.0,23)
0154      CALL SCALE (YL8G,NDAYS,5.00, 80.0,-20.0,24)
0155      CALL SCALE (ZH8G,NDAYS,5.00, 80.0,-20.0,25)
0156      CALL SCALE (ZL8G,NDAYS,5.00, 80.0,-20.0,26)
0157      CALL SYMRL4 (-0.25,2.0,0.07,'TEMPERATURE (JC)',90.0,16)
0158      CALL SYMRL4 (0.2,4.8,0.1,'COMPARISON OF MAXIMUM AND MINIMUM TEMPER-
ATURES', 0.0,46)
0159      CALL SYMRL4 (0.2,4.66,0.08,'AT SOIL SURFACE ON BARE GROUND ON', 0.0,33)
A
0160      CALL SYMRL4 (0.2,4.52,0.08,'IRRIGATED AND NON-IRRIGATED PLOTS', 0.0,33)
A
0161      CALL DATE  (NYEAR,0.2,4.37)
0162      CALL LEGEND (2.6,75,4,8)
0163      CALL ZERO  (1.0)
0164      CALL SYMRL4 (8.32,2.0,0.07,'TEMPERATURE (JF)',90.0,16)
0165      CALL LINES (XPLT,YH8G,NDAYS,0.01,3)
0166      CALL LINE  (XPLT,YLBG,NDAYS,1)
0167      CALL DASH  (XPLT,ZHBG,NDAYS,0.04)
0168      CALL DASH  (XPLT,ZLBG,NDAYS,0.02)
0169      GO TO 300
C
C
C*****PLOT 13*****COMPARISON OF MEANS OF BARE GROUND
C
C
0170      13 CALL AXFS  (3.0,PC7(3),4.0,5,7,1,LC7(5),5,0.5,14,2)
0171      CALL SCALE (YHA3,NDAYS,3.00, 50.0,-10.0,27)
0172      CALL SCALE (YLA3,NDAYS,3.00, 50.0,-10.0,28)
0173      CALL SYMRL4 (-0.25,1.0,0.07,'TEMPERATURE (JC)',90.0,16)
0174      CALL SYMRL4 (0.2,2.8,0.1,'COMPARISON OF DAILY MEAN TEMPERATURES', 0.0,37)
A
0175      CALL SYMRL4 (0.2,2.7,0.07,'ON BARE GROUND ON IRRIGATED',0.0,27)
0176      CALL SYMRL4 (0.2,2.6,0.07,'AND NON-IRRIGATED PLOTS',0.0,23)
0177      CALL DATE  (NYEAR,0.2,2.45)
0178      CALL LEGEND (3.6,5,2.8)
0179      CALL ZERO  (0.5)
0180      CALL SYMRL4 (8.32,1.0,0.07,'TEMPERATURE (JF)',90.0,16)
0181      CALL LINES (XPLT,YHA3,NDAYS,0.01,2)
0182      CALL DASH  (XPLT,YLA3,NDAYS,0.03)
0183      GO TO 300
0184      END

0001      BLOCK DATA
0002      COMMON /PLOTO/ XPLT(366), ITAPE
A       /PLCT1/ RAIN(366), XIRR(366), YIRR(366), YNIR(366)
B       /PLOT2/ SNOW(366)
C       /PLOT3/ YHH0(366), YLH0(366)
D       /PLOT4/ HUMD(366)
E       /PLOT5/ EVAP(366)
F       /PLOT6/ WIND(366)
G       /PLOT7/ YMAX(366), YMINT(366)
H       /PLOT8/ YH5C(366), YL5C(366), ZH5C(366), ZL5C(366)
I       /PLOT9/ YHAI(366), YLA1(366)
J       /PLOT10/ YHSS(366), YLSS(366), ZHSS(366), ZLSS(366)
K       /PLOT11/ YHAB(366), YLA2(366)
L       /PLOT12/ YH8G(366), YLBG(366), ZHBG(366), ZLBG(366)
M       /PLOT13/ YHAR(366), YLA3(366)

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COMMON /LABELS/ AX1(37), AY1(37), AX2(73), AY2(73),  
 BX(4), BY(4), XL(4), YL(4),  
 RC1(7), LC1(7), RC2(13), LC2(13),  
 RC3(11), LC3(11), RC4(13), LC4(13),  
 RC5(11), LC5(18), RC6(8), LC6(16),  
 PC7(12), LC7(24)  
 C TAPE UNIT NUMBER  
 DATA ITAPE /5/  
 DATA RCL,LC1 /\* 0 , , - , 25- , , - , 50- , , - ,  
 A 75- , , 0 , , - , - 1 , , - , - 2 ,  
 B - , , 3 /  
 DATA RC2,LC2 /\* 0 , , 25- , , 50- , , 75- , , 100- , , 125- ,  
 A 150- , , 175- , , 200- , , 225- , , 250- , , 275- ,  
 B 300- , , 0 , , - 1 , , - 2 , , - 3 , , - 4 ,  
 C - 5 , , - 6 , , - 7 , , - 8 , , - 9 , , - 10 ,  
 D - 11 , , - 12 /  
 DATA RC3,LC3 /\* 0 , , 10- , , 20- , , 30- , , 40- , , 50- ,  
 A 60- , , 70- , , 80- , , 90- , , 100- , , 0 ,  
 B - 10 , , - 20 , , - 30 , , - 40 , , - 50 , , - 60 ,  
 C - 70 , , - 80 , , - 90 , , - 100 /  
 DATA RC4,LC4 /\* 0 , , 2- , , 4- , , 6- , , 8- , , 10- ,  
 A 12- , , 14- , , 16- , , 18- , , 20- , , 22- ,  
 B 24- , , 0 , , - 2 , , - 4 , , - 6 , , - 8 ,  
 C - 10 , , - 12 , , - 14 , , - 16 , , - 18 , , - 20 ,  
 D - 22 , , - 24 /  
 DATA RC5,LC5 /\* 0 , , 2- , , 4- , , 6- , , 8- , , 10- ,  
 A 12- , , 14- , , 16- , , 18- , , 20- , , 0 ,  
 B 0 , , - 0 , , 1 , , - 0 , , 2 , , - 0 ,  
 C 3 , , - 0 , , 4 , , - 0 , , 5 , , - 0 ,  
 D 6 , , - 0 , , 7 , , - 0 , , 8 /  
 DATA RC6,LC6 /\* 0 , , 40- , , 80- , , 120- , , 160- , , 200- ,  
 A 240- , , 280- , , 320- , , 360- , , 400- , , 5 /  
 B - 5 , , 0 , , - 7 , , 15 , , - 17 , , 0 ,  
 C - 12 , , 5 , , - 15 , , 0 , , - 17 , , 5 /  
 DATA RC7,LC7 /\*-30- , , -20- , , -10- , , 0 , , 10- , , 20- ,  
 A 30- , , 40- , , 50- , , 60- , , 70- , , 80- ,  
 B - 2 , , 2 , , - 4 , , - 6 , , - 8 , , - 10 ,  
 C - 3 , , 2 , , - 5 , , 0 , , - 7 , , - 9 ,  
 D - 8 , , 6 , , - 10 , , 4 , , - 12 , , 2 ,  
 E - 14 , , 0 , , - 15 , , 8 , , - 17 , , 6 /  
 DATA BX,BY /2\*0.0, 2\*7.94, 4\*0.0/  
 DATA XL,YL /3.99, 2\*0.0, -0.04, 2\*0.0, 2\*1.34/  
 DATA AX1,AY1 /2\*7.94, 3\*7.27, 3\*6.61, 3\*5.94, 3\*5.29, 3\*4.61,  
 A 3\*3.94, 3\*3.29, 3\*2.61, 3\*1.96, 3\*1.28, 3\*0.67, 2\*0.0,  
 B 0.03, 2\*0.0, 0.03, 2\*0.0, 0.03, 2\*0.0, 0.03, 2\*0.0,  
 C 0.03, 2\*0.0, 0.03, 2\*0.0, 0.03, 2\*0.0, 0.03, 2\*0.0,  
 D 0.03, 2\*0.0, 0.03, 2\*0.0, 0.03, 2\*0.0, 0.03, 2\*0.0,  
 E 0.03 /  
 DATA AX2 /2\*7.54, 3\*7.60, 3\*7.27, 3\*6.94, 3\*6.61, 3\*6.28,  
 A 3\*5.95, 3\*5.62, 3\*5.29, 3\*4.95, 3\*4.61, 3\*4.28,  
 B 3\*3.94, 3\*3.62, 3\*3.29, 3\*2.95, 3\*2.61, 3\*2.29,  
 C 3\*1.96, 3\*1.62, 3\*1.28, 3\*0.98, 3\*0.67, 3\*0.34, 2\*0.0 /  
 DATA AY2 /-0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0,  
 A -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0,  
 B -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0,  
 C -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0,  
 D -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0,  
 E -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0, -0.03, 2\*0.0,  
 F -C.03 /  
 C17 END  
 0001 SUBROUTINE AXES (HT,X,NXC,DX,N1,M1,Y,NYC,DY,N2,M2)  
 C  
 C GRAPH A BOX OF HEIGHT HT WITH THE MONTHS PLOTTED ALONG THE BOTTOM.  
 C ALSO LABEL THE BOX WITH APRAY X ON THE RIGHT AND Y ON THE LEFT.  
 C DX IS THE DISTANCE BETWEEN EACH LABEL. N1 IS THE NUMBER OF LABELS  
 C AND M1 IS THE STEP BETWEEN LABELS. THE SAME IS TRUE FOR ARRAY Y  
 C WITH DY, N2, AND M2.  
 C  
 0002 DIMENSION X(N1), Y(N2)  
 0003 COMMON /LABELS/ AX1(37), AY1(37), AX2(73), AY2(73),  
 A BX(4), BY(4)  
 0004 DATA NCOUNT /1/

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0005      IF(NCOUNT.NE.1) GO TO 10
0006      CALL PLOTS (12.0,0.0,-3)
0007      CALL PLOT (2.0,1.0,-3)
0008      GO TO 11
0009      10 CALL PLOT (0.0,0.5,-3)
0010      11 CALL PLTMRK (-2.0,0.0)
0011      NCOUNT = NCOUNT + 1
0012      IF(NCOUNT.EQ.5) NCOUNT = 1
0013      RY(2) = HT
0014      BY(3) = HT
0015      CALL SYMBL4 (.0,.0,.03,.07,* JANUARY FEBRUARY MARCH A
APRIL MAY JUNE JULY AUGUST SEPTEMBER DC
0016      * BTOBER NOVEMBER DECEMBER*,0.0,131)
0017      CALL LINE (AX1,AY1,37,1)
0018      CALL PLOT (0.0,0.27,-3)
0019      CALL SYMBL4 {0.0,-0.11,0.07,*1 15 1 15 1 15 1 15 1
A 15 1 15 1 15 1 15 1 15 1
B 15 1 15 1 15 1 15 1 15 1
0020      CALL LINE (AX2,AY2,73,1)
0021      CALL LINE (BX,BY,4,1)
0022      DYY = -0.03
0023      DO 12 I=1,N2,M2
0024      CALL SYMBL4 (7.9,DYY,0.07,Y(I),0.0,NYC)
0025      DYY = DYY + DY
0026      12 CONTINUE
0027      DXX = -0.03
0028      DO 13 I=1,N1,M1
0029      CALL SYMBL4 (-0.22,DXX,0.07,X(I),0.0,NXC)
0030      DXX = DXX + DX
0031      13 CONTINUE
0032      GO TO 14
C      DRAW ZERO LINE AT HEIGHT HT.
C
0033      ENTRY ZERO (HT)
0034      BY(2) = HT
0035      BY(3) = HT
0036      CALL LINE (BX(2),RY(2),2,1)
0037      14 RETURN
END

0001      SUBROUTINE DASH (X,Y,N,S)
C      SUBROUTINE DASH WILL DRAW DASHED LINES
C
C      X = X ARRAY
C      Y = Y ARRAY
C      N = NUMBER OF POINTS
C      S = LENGTH OF DASHES
C
0002      DIMENSION X(N), Y(N), A(2), B(2)
0003      SS = S * 2.0
0004      DO 30 I=2,N
0005      DX = X(I) - X(I-1)
0006      DY = Y(I) - Y(I-1)
0007      H = SQRT(DX*DX + DY*DY)
0008      DX = S * DX / H
0009      DY = S * DY / H
0010      A(1) = X(I-1)
0011      B(1) = Y(I-1)
0012      10 CONTINUE
0013      IF(H.LE.S) GO TO 20
0014      A(2) = A(1) + DX
0015      B(2) = B(1) + DY
0016      CALL LINE (A,B,2,1)
0017      IF(H.LE.SS) GO TO 30
0018      A(1) = A(2) + DX
0019      B(1) = B(2) + DY
0020      H = H - SS
0021      GO TO 10
0022      20 A(2) = X(I)
0023      B(2) = Y(I)
0024      CALL LINE (A,B,2,1)
0025      30 CONTINUE

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0026      GO TO 99
C
C      SUBROUTINE LINES WILL MAKE THE LINE DARKER AND WIDER BY DRAWING
C          N NUMBER OF LINES
C
C      X = X ARRAY
C      Y = Y ARRAY
C      N = NUMBER OF POINTS
C      D = DISTANCE BETWEEN LINES
C      M = NUMBER OF LINES
C
0027      ENTRY LINES (X,Y,N,D,M)
0028      DY = 0.0
0029      DO 40 I=1,M
0030      CALL LINE (X,Y,N,1)
0031      CALL PLOT (0.0,D,-3)
0032      DY = DY - D
0033      40 CONTINUE
0034      CALL PLOT (0.0,DY,-3)
0035      GO TO 99
0036      ENTRY BAR (X,Y,N)
0037      SS = 0.3
0038      CALL PLOT (X(1),SS,3)
0039      DO 50 I=2,N
0040      CALL PLOT (X(I-1),Y(I),1)
0041      CALL PLOT (X(I),Y(I),1)
0042      50 CONTINUE
0043      CALL PLOT (X(N),SS,1)
0044      99 RETURN
0045      END

0051      SUBROUTINE DATE (NYR,X,Y)
C
C      GRAPH DATE SPECIFIED BY NYR AT POINT (X,Y)
C
0002      CALL SYMBL4 (X,Y,0.07,'PRCVO, UTAH',0.0,12)
0003      N = NYR-1969
0004      GOTO (1,2,3,4,5), N
0005      1 CALL SYMBL4 (X+0.78,Y,0.07,'1970',0.0,4)
0006      RETURN
0007      2 CALL SYMBL4 (X+0.78,Y,0.07,'1971',0.0,4)
0008      RETURN
0009      3 CALL SYMBL4 (X+0.78,Y,0.07,'1972',0.0,4)
0010      RETURN
0011      4 CALL SYMBL4 (X+0.78,Y,0.07,'1973',0.0,4)
0012      RETURN
0013      5 CALL SYMBL4 (X+0.78,Y,0.07,'1974',0.0,4)
0014      RETURN
C
C      ENTRY LEGEND (N,X,Y)
C
0015      C
0016      GRAPH ONE OF FOUR LEGENDS SPECIFIED BY N AT POINT (X,Y)
C
0017      GOTO (10,11,12,13),N
0018      10 CALL SYMBL4 (X,Y,0.07,'MAXIMUM',0.0,7)
0019      CALL SYMBL4 (X,Y-0.1,0.07,'MINIMUM',0.0,7)
0020      RETURN
0021      11 CALL SYMBL4 (X,Y,0.07,'MAX NON-IRR',0.0,11)
0022      CALL SYMBL4 (X,Y-0.1,0.07,'MIN NON-IRR',0.0,11)
0023      CALL SYMBL4 (X,Y-0.22,0.07,'MAX IRRIGATED',0.0,13)
0024      CALL SYMBL4 (X,Y-0.32,0.07,'MIN IRRIGATED',0.0,13)
0025      RETURN
0026      12 CALL SYMBL4 (X,Y,0.07,'MEAN NON-IRRIGATED',0.0,18)
0027      CALL SYMBL4 (X,Y-0.1,0.07,'MEAN IRRIGATED',0.0,14)
0028      13 RETURN
0029      END

0030      SUBROUTINE SCALE (X,N,S,YMAX,YMIN,IO)
C
C      SCALE DATA IN APRT X DIMENSIONED BY N AND RETURN SCALED DATA IN
C          Y.  S IS THE MAXIMUM HEIGHT OF SCALED DATA, YMAX HAS MAXIMUM
C          ALLOWED DATA AND YMIN THE MINIMUM.  SHOULD DATA EXCEED THESE
C          BOUNDS, THE IO NUMBER WILL BE PRINTED ALONG WITH THE DATA.

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0002      DIMENSION X(N)
0003      SS = S / (YMAX-YMIN)
0004      DO 10 I=1,N
0005      IF(X(I).LT.YMIN) WRITE(6,101) ID, X(I), YMIN
0006      IF(X(I).GT.YMAX) WRITE(6,100) ID, X(I), YMAX
0007      X(I) = SS * (X(I) - YMIN)
0008      10 CONTINUE
0009      RETURN
0010 100 FORMAT(' CALL ',I2,5X,F10.2,' EXCEEDED ',F9.1)
0011 101 FORMAT(' CALL ',I2,5X,F10.2,' WAS BELOW ',F8.1)
0012      END

001      SUBROUTINE REALC (IYEAR,NDAYS)
C
C      READ ONE YEAR'S DATA SPECIFIED BY IYEAR. THE FIRST CARD IS A DATA
C      HEADER CONTAINING THE YEAR, NUMBER OF DAYS IN YEAR AND LAST
C      RECORDED WIND VALUE OF PREVIOUS YEAR. RETURN NUMBER OF DAYS IN
C      NDAYS.
C
0002      COMMON /PLCT0/  XPLT(366), ITAPE
A     /PLCT1/  TPRE(366), YIRR(366), YNIR(366)
P     /PLCT2/  SNCV(366)
C     /PLCT3/  HHUM(366), LHUM(366)
D     /PLCT4/  THRS(366)
E     /PLCT5/  PEVP(366)
F     /PLCT6/  WIND(366)
G     /PLCT7/  YMAX(366), YMIN(366)
H     /PLCT8/  YH5C(366), YL5C(366), ZH5C(366), ZL5C(366)
I     /PLCT9/  YHAL(366), YLA1(366)
J     /PLCT10/ YHSS(366), YLSS(366), ZHSS(366), ZLSS(366)
K     /PLCT11/ YHA2(366), YLA2(366)
L     /PLCT12/ YHBC(366), YLRG(366), ZHBC(366), ZLBC(366)
M     /PLCT13/ YHA3(366), YLA3(366)
COMMON /LABELS/  DUMY(226), XL14), YL14)
REAL   CR(11)  /' 0 ', ' - ', ' 10-', ' - ', ' 20-', ' - ',
A     ' 30-', ' - ', ' 40-', ' - ', ' 50 '/
      REAL HHUM, LHUM, NIKW, NIDW, IRWW, IRDW, OLDW
      AVE(X,Y) = (X+Y)/Z..C
C
1  READ(ITAPE,200,END=599) IYR,NDAYS,OLDW
200 FORMAT(2I4,F4.0)
      IF(IYEAR.EQ.IYR) GO TO 3
      DO 2 I=1,NDAYS
      2 READ(ITAPE,200,END=599)
      GO TO 1
C
3  DO 4 I=1,NDAYS
      READ(ITAPE,201,END=599) RAIN, SNOW, SNCV(I), IRWW, IRDW, NIWW,
A        NIDW, HHUM(I), LHUM(I), THRS(I), PEVP(I),
B        CLCV, WIND(I), YMAX(I), YMIN(I),
C        YH5C(I), YL5C(I), YHSS(I), YLSS(I), YHBC(I),
D        YLBG(I), ZH5C(I), ZL5C(I), ZHSS(I), ZLSS(I),
E        ZHBC(I), ZLBC(I)
599 FORMAT(5X,F3.2,4F3.1,2X,2F3.1,1X,2F3.0,F2.0,F3.1,F2.0,F3.0,/,,
A        5X,2F3.0,6X,12F3.0)
      XPLT(I) = I
      TPRE(I) = RAIN + SNOW*0.1
      YIRR(I) = -1.0
      YNIR(I) = -1.0
      IF(NIWW.NE.1.0) YNIR(I) = (NIWW-NIDW)*100.0/NIDW
      IF(IRWW.NE.0.0) YIRR(I) = (IRWW-IRDW)*100.0/IRDW
      IF(OLDW.GT.WIND(I)) OLDW = OLDW - 1000.0
      HOLD = WIND(I)
      WIND(I) = (WIND(I)-CLDW) * 1.6093*0.05
      OLDW = HOLD
      YHAL(I) = AVE(YH5C(I),YL5C(I))
      YLA1(I) = AVE(ZH5C(I),ZL5C(I))
      YHA2(I) = AVE(YHSS(I),YLSS(I))
      YLA2(I) = AVE(ZHSS(I),ZLSS(I))
      YHBC(I) = AVE(YHBC(I),YLRG(I))
      YLA3(I) = AVE(ZHBC(I),ZLBC(I))

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0C32      4 CONTINUE
0C33      YDAYS = NDAY$ 
0C34      CALL SCALE (XPLT,NDAYS,7.94,YDAYS, 1.0, 1)
0C35      RETURN
0C36      599 WRITE(6,5)J
0C37      500 FORMAT('*****ERROR IN INPUT DATA FROM TAPE *****',//)
0C38      STOP
C
C
0C39      ENTRY MOIST
0C40      CALL PLOT  (U.0,1.2,-3)
0C41      N = J
0C42      DO 20 I=121,306
0C43      IF(YIKR(I).LT.0.0) GO TO 20
0C44      N = N + 1
0C45      YIKR(N) = YIKR(I)
0C46      XIRR(N) = XPLT(I)
0C47      20 CONTINUE
0C48      CALL SCALE (YIKR,N,1.28,50.0,C.0,29)
0C49      CALL LINE (XIRR,YIKR,N,1)
0C50      N = 0
0C51      DO 30 I=121,306
0C52      IF(YNIR(I).LT.0.0) GO TO 30
0C53      N = N + 1
0C54      XIRR(N) = XPLT(I)
0C55      YNIR(N) = YNIR(I)
0C56      30 CONTINUE
0C57      CALL SCALE (YNIR,N,1.28,50.0,D.0,30)
0C58      CALL CASH (XIRR,YNIR,N,C.04)
0C59      CALL PLOT  (2.61,J.2,-3)
0C60      CALL LINE  (XL,YL,4,1)
0C61      DY = -0.03
0C62      DO 40 I=1,11
0C63      CALL SYMBL4 (-.22,DY,J.37,CR(I),D.0,4)
0C64      DY = DY + 0.13
0C65      40 CONTINUE
0C66      CALL SYMBL4 (-0.22,C.45,C.07,'PERCENT',90.0,7)
0C67      CALL SYMBL4 (3.21,E3,C.07,'SOIL MOISTURE (IRRIGATED)',D.0,25)
0C68      CALL SYMBL4 (3.21,E3,C.07,'SOIL MOISTURE (NON-IRRIGATED)',D.0,29)
0C69      CALL PLOT (-2.61,-1.2,-3)
0C70      RETURN
0C71      END

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